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**28 August 1985**

# **USSR Report**

**ENERGY**



**FOREIGN BROADCAST INFORMATION SERVICE**

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28 August 1985

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ENERGY**

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OIL AND GAS

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OIL INDUSTRY SOCIO-ECONOMIC EXPERIMENT DESCRIBED

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 3, Mar 85 pp 11-26

[Transcription of round-table discussion of an industry-wide socio-economic experiment to improve the economic mechanism with an experimental integrated flow-line production system: "A Socio-Economic Experiment of Great National Economic Import: The Spread, from the Production, Economic and Social Viewpoint: An Experiment in the Spread as Part of the Program to Improve the Economic Mechanism"]

[Text] The advantages of the spread, as well as the problems associated with its operation and the methods for developing it were discussed at a "round table" held by the journals "EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA" [EKO] and "STROITEL'STVO TRUBOPROVODOV" [ST].

The meeting was chaired by Academician A.G. Aganbegyan, editor-in-chief of EKO, and director of the Institute of the Economics and Organization of Industrial Production [IEiOPP, in Novosibirsk].

Among those participating in the discussion were:

G. I. Shmal'--STROITEL'STVO TRUBOPROVODOV editor-in-chief and first deputy minister of construction of petroleum and gas industry enterprises, USSR;

A. P. Vesil'yev--deputy minister of construction of petroleum and gas industry enterprises, USSR;

N. Ya. Rusanov--Minneftegazstroy party committee secretary;

I. I. Mazur--member of the ST editorial board, chief of Glavtruboprovodstroy [Main Pipeline Construction Administration] and member of the Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises] board;

A. M. Mikhaylichenko--director of the Welding-Assembly Trust;

I. G. Shaykhutdinov--Hero of Socialist Labor and chief of the [Tatnefteprovodstroy] Tatar Petroleum Pipeline Construction Trust KTP [Spread];

Yu. S. Semenyuk--chief of the KTP-1 of the Kuybyshevtruboprovodstroy [Kuybyshev Pipeline Construction] Trust;

A. A. Serdyukov--chief of the KTP of the Bryansktruboprovodstroy [Bryansk Pipeline Construction] Trust;

Ya.-S. A. Myakush--Hero of Socialist Labor and Spread brigade leader of the Welding and Assembly Trust;

V. I. Satarov--USSR State Prize winner and Spread brigade Leader of the Mosgazprovodstroy [Moscow Gas Pipeline Construction] Trust;

Yu. R. Anpilogov--member of the ST editorial board and chief of the Minneftegazstroy Labor and Wages Administration;

L. M. Chernyak--candidate of economic sciences and deputy chief of the Minneftegazstroy Main Economic Planning Administration;

V. A. Alyutov--chief engineer of the Minneftegazstroy Main Technical Administration;

Yu. G. Ivanov--deputy chief of the Minneftegazstroy Labor Force and Everyday Life Administration;

Yu. P. Filippov--chief of the Glavtruboprovodstroy [Main Pipeline Construction Administration] Office of Labor Organization and Wages;

M. P. Karpenko--doctor of technical sciences, USSR State Prize laureate and head of the VNIIST [All-Union Scientific-Research Institute for Pipeline Construction] Office;

B. S. Vaynshteyn--doctor of economic sciences and head of the VNIIPIgidrotruboprovodov [All-Union Scientific-Research and Planning Institute for Hydraulic Pipelines] laboratories;

A. D. Khaytun--candidate of economic sciences and head of the NIPIorgneftegazstroy [Scientific-Research and Planning Institute for the Organization of Oil and Gas Industry Construction] department;

V. K. Kashin--candidate of psychological sciences and head of the NIPIorgneftegazstroy laboratories;

V. V. Bakerin--department head of the Neftegazstroytrud [Oil and Gas Construction and Labor] NOT [Scientific Organization of Labor] Center;

B. I. Cheglakov--deputy chief of the USSR Stroybank [Bank for Financing Capital Investments] Administration;

Ye. B. Kibalov--candidate of economic sciences and senior IEiOPP scientific associate;

B. P. Kutyrev--head of the EKO office, candidate of economic sciences and senior IEiOPP scientific associate.

EKO-- the journal of the Siberian Division of the USSR Academy of Sciences, has been in publication since 1970, and is published 12 times per year. At present over 140,000 copies of EKO are published per monthly issue. There are over one thousand foreign subscribers. EKO is the country's sole publication dedicated to the intersectorial problems of controlling production.

The journal is designed for a wide readership--economic directors and the rank and file production workers, the scientific workers who are involved in the system of studying economic education and is for students as well. The journal raises problems of a theoretical nature, throws light on advanced production experience and makes a variety of recommendations. EKO gives consulting help to specific enterprises. The journal stands out in its striving to provide the kind of information which would help the reader to improve his perception, and help him to assimilate the subjects elucidated therein, which subjects might become a topic of discussion, or might lead to a creative solution to a number of pressing problems. That is the reason for the "round table" meetings, the thematic choices, the interviews, the questionnaires, the practical training etc.

#### Opening Address by A. G. Aganbegyan

The present time is a turning point in the country's economic development, inasmuch as the conditions in which it operates economically are undergoing radical changes. Up to now, our economic growth has been the result of enlisting additional resources, i.e. the result of extensive factors, and, to a lesser degree by improving our effectiveness in using these resources. At present, opportunities to increase our production resources have been sharply curtailed: because of the demographic consequences of the War, there will be no increase in the numbers of production workers, the increase in capital investments will be one-half to one-third as much, due to the reduction in the accumulation fund of the national income, growth in fuel and raw materials is being reduced by one-third to one-fifth as a result of the worsening conditions in which they must be recovered and the need to relocate the fuel and raw material recovery facilities into uninhabited northern and eastern areas. In this situation, the resources which are increasing at slower rates have to be made up for by additional effectiveness in public sector production.

At the same time, solutions to those social problems which have now become unavoidable require a change-over of the national economy to the path of intensive growth. So that the all-round intensification of the national economy, and a marked improvement in its efficiency will become the pivot of the party's economic policy.

And that is why it is now so important to find new ways to improve our efficiency. And here, the prime method is through the mobilization of the organizational-economic and social factors associated with improving the administrative system and the entire economic mechanism. That is why Minneftegazstroy's experience in restructuring the administration of pipeline construction, with its conversion to the use of integrated organizations, all focused on the final result, and the bringing in of the collective contract in the spreads is of tremendous, as well as universal, interest. Let us endeavor to gain a thorough understanding of this experience.

#### THE ROLE OF THE EXPERIMENT IN SOLVING THE SECTOR'S PROBLEMS, AND AN APPRAISAL OF ITS EFFECTIVENESS

EKO: How has the sector been working during the last years of the 11th Five-Year Plan? What role has the experiment played in the results achieved? And what are the volumes and specifics of upcoming work?

G. I. Shmal': From the standpoint of fulfilling the Power Production Program, it might be difficult at present to find other businesses or other organizations comparable to ours. I am not talking this way from a desire to boast, but taking into consideration the problems which still remain to be resolved. The sector's production volumes are steadily increasing--both construction-installation work and the output of marketable building products. During four years of the five-year plan period, the volume of construction and installation work saw an increase of R2.2 million compared to 1980. The annual program for a number of union ministries was smaller, and especially for republican ministries. According to a number of indicators more has already been accomplished during three and one-half years than for the entire 10th Five-Year Plan period. Thus volumes of large-diameter pipeline construction have exceeded the indicators for the 10th Five-Year Plan period. The current five-year plan period's assignment for labor productivity was fulfilled during its first three years.

Mention should be made of the increase in the factor of the complexity of our operations during the 11th Five-Year Plan period, especially during the years ahead. In the first place, there is a sharp increase in the volumes of pipeline being laid, as well as other work on remaining projects, including efforts in the fields. Second, we are moving farther and farther northward. Western Siberia itself is, so to speak, not a free gift for us to live and work in, and we are coming upon the most challenging sections here, and in going on to Urengoy and Yamburg we come to permafrost. If we had to deal with permafrost only once before--when we constructed the Messoyakha-Norilsk gas pipeline, then at present we face it every day.

The sector's importance to the national economy and the increase in the complexity of its operation have made necessary a quest for more efficient solutions to the tasks we've been charged with. Among the solutions, the fully-unitized method--a mainline surface construction administration--stands out prominently. As concerns line construction, the experiment in using spreads is by and large one of the directions which makes it possible to improve production efficiency in our sector and to construct gas and oil pipelines as well as other facilities more quickly and at lower cost. Time is the most important factor today. Our experiment is making it possible for us to win time. This is the most critical factor, and has been obtained thanks to the implementation of spreads.

A. P. Vesel'yev: As Gennadiy Iosifovich said, Minneftegazstroy's program of construction and installation operations is growing quite quickly. In 1972, when the ministry was set up, volumes of construction and installation work amounted to R2.3 billion, against R6.5 billion in 1984; that is, a 2.8-fold increase! Not a single other construction ministry has made similar gains. These results were attained thanks to the unfaltering aid and concern of the CPSU Central Committee and the Soviet Government, as well as the selfless labor of our workers and engineers on the surface facility sites and along the right of ways of the main pipelines.

Through the years, the ministry has worked purposefully to improve production efficiency. There is an ongoing program for the technical re-equipping of line construction work, new organizational forms are being sought, new administrative structures are being organized and the lower links are being restructured. Work is being carried out on the general administrative scheme. All of these organizational and technical factors will help to solve the major tasks which have been set before us. The superpowerful gas pipelines from Urengoy to the Center, which are being erected on the instructions of the 26th CPSU Congress, have been turned over ahead of time. The technical, production and organizational innovations have played an important role in this, just as innovations in the social sphere, in the organization and stimulation of labor have played a far from minor role, especially those innovations associated with the use of spreads.

G. I. Shmal': On the whole, our spreads have not simply completed their production assignments, but have achieved results undreamed of by us when we started this experiment. The regular flow-production crews, even the ones not working on a unified joborder showed in 1981-1982 that they can lay 100-150 km of pipeline (and some of them 200 km) per year. The ministry average for this indicator is 45-46 km. The flow-line production crews working on a unified contract, and this includes technical engineering workers, managed to erect, while working on the Urengoy-Uzhgorod and Urengoy-Tsentr-I pipelines, 14.1 km per month against the 7 km built by crews not working on a unified joborder. There was a reduction in direct costs per km of pipeline erected as well, and the ratio of the wages paid to the volume of construction and installation work completed was improved.

## THE BASIS OF THE EXPERIMENT AND THE PROBLEMS OF REORGANIZATION

EKO: The experiment, naturally, did not originate in a vacuum. What was the initial reason for carrying it out?

G. I. Shmal': We had already had experience in high-speed construction using brigades from Buyanov and Kildyushov (of the Sibkomplektmontazh [Siberian Association for the Installation of Equipment in Complete Sets] Association to build oil pumping stations in 1976-1977. For example, in 1977 these brigades completed construction of 10 oil pumping stations. For the sake of comparison, in 1984 the entire ministry managed to build 13 stations. Later, it turned out that the excellent business was somewhat neglected. Later there was the experience of the accelerated columns who worked in Glavsvibtruboprovodstroy [Main Siberian Pipeline Construction Administration] in 1977-1978. By the way, the Siberians were the first to come forward and organize integrated pipeline-building trusts.

The ministry has developed a goal-oriented integrated program. It has a long title: "The Development and Introduc[tion] of Combinations of Equipment, Production Methods and Organization of Flow-Line High-Speed Construction of Main 1,420 mm Diameter Pipelines to be Operated at a Pressure of 7.5-12 MPa and Completely Unitized Compressor Stations for the Transport of Gas from Western Siberia to the Country's European Centers", but the specified tasks are accurately reflected in that title. The program calls for the reorganization of the administrative structure of pipeline construction.

EKO: What are the special features of this reorganization? What problems have come up?

G. I. Shmal': There was a time when all the earth-moving work along the pipeline right-of-ways was handled by the earth-moving trusts for the entire Soviet Union, and welding was done by special trusts, among which amounted to a few for the entire country.

At present in the sector the basic administrative links are the trusts which are specialized according to the types of construction appropriate to the completion of the entire complex of operations called for in the plan, and for putting production capacities and facilities into operation on time. With the setting up of the integrated pipeline construction trusts, it became feasible to organize lower-level subdivisions, specialized along the lines of the stages of construction of a main pipeline.

I. I. Mazur: Our orientation to the spreads completely meets the needs of the tasks of the present stage of improvement in the organization of line construction. The first step in bringing this structure to realization was to unify, in the pipeline construction industry, several subsections, subordinate to a unified general contract. Here we had 100 km of right-of-way, excavator operators, welders and general contractors. There were three different bosses, three different supply organizations, a variety of social conditions. Today, base settlements for 500-700 persons each, have been set up. The opportunity to solve production tasks, social problems etc. showed up right away.

G. I. Shmal': Not everything that was planned has been realized. For example, not only did spreads have to be organized, but structural subdivisions to handle specified jobs, in particular road-building and transport work: the PMK-1 [Mobile Mechanized Column]. PMK-2 was occupied with extremely complicated jobs such as constructing pipeline crossings and installing compressor station hookups etc.

I. I. Mazur: In the course of the experiment, we discovered a need for speeded up engineering support: tunnels had to be dug under roads in time for the connections to be made by the corresponding subdivisions. However, the subdivisions which were earmarked to make the connections in the first place were the last to get to them. The flow-line crew would finish its work, but the technical engineering subdivision which was supposed to proceed ahead of it continued to be absent from the job. As a result, some of the engineering work had to be given to the flow-line production crew. That is why corresponding subdivisions had to be made part of the flow-line production units. We have set up sections in our motor transport columns, and have given them excavators and bulldozers, making it possible to maintain the roads.

A. M. Mikhaylichanko: Spread No 3 handles about 45 percent of the work of the Welding-Assembly Trust during construction of 1,420 mm diameter gas pipelines. The operation of this unit has demonstrated great advantages. In essence, a spread is a constantly-operating plant. The system it uses in working with subcontracting organizations has been fine-tuned as well. There has never been any doubt in our trust about the need to organize a second mobile mechanized column. As concerns our PMK-1, when conditions dictate that we have to re-clear large areas of ground, we simply decided not to organize these subdivisions, but to assign this work to the flow-line production crews.

G. I. Shmal': Yes, the spreads are already taking on some of the PMK-2's work. PMK-1 has worked effectively in a number of main administrations, especially so in Glavvostoktruboprovodstroy [Main Administration for Pipeline Construction in the Far East]. In Glavtruboprovodstroy [Main Administration for Pipeline Construction], in my opinion, the introduction of the unified job order, as based on pay for completed work, has turned out quite well. In this fashion, the individual collectives have methods of improving the organization of production, which are tailored specifically for them.

EKO: As the present-day production is organized, two tendencies seem to be at odds: one which promotes specialization, and the other, in favor of integration. How are they combined in spreads?

G. I. Shmal': It should be noted that integration, in our situation, has led to much better results than narrow specialization, although from the point of view of all the theories, deep specialization increases labor productivity. Within the framework of the integrated trusts themselves, the PMK-1, the PMK-2 and the spreads as well have been specialized. Here, the effect has been achieved as the result of their interchangeability, the reduction in work-time losses, work stoppages etc.

I. I. Mazur: Specialization is here to stay. But if it was previously on the trust level, now it's on the flow-line production unit level. Thus specialization has in no wise been done away with, since it has become the means by which production efficiency has been improved.

#### LABOR AND WAGES IN THE FLOW-LINE PRODUCTION UNIT

EKO: What is the essence of the change-over of the spreads to the joint contract?

Yu. R. Anpilogov: The wages and the payment of bonuses for completed work--each km of pipeline built and turned over for testing--to all categories of line workers working on a unified job order was introduced into the spreads as an experiment.

The principles of the brigade cost-accounting contract were disseminated into the most large-scale structure, such as the integrated flow-line spread. In this connection, a cost accounting contractual obligation concluded between the flow-line production unit and the trust became the organizational foundation for the operation of the flow-line collective and the stimulation of the workers.

ST: It is plain to see that changing over the lower-level line subdivisions to work on a collective contract oriented on the finished product required the development of a special system of labor incentives. How did this differ from the system in use in the construction industry?

Yu. R. Anpilogov: Making every ruble of wages paid out in the construction industry effective and justified is no simple task.

Beginning in 1982, we made an experimental attempt to eliminate the shortcomings which were peculiar to the incentive system which was in effect at the time in the construction industry. It is common knowledge that this system, in many respects, had lost its economic and social significance as a measure or a labor incentive. The basic reasons for this, in my opinion, are the following. First of all, the separation of actual wage payments from the finished construction product. At present, even a job order for a large-integrated brigade is drawn up, as a rule, for a number of individual types of work, and is calculated by the month, not by the completion of the jobs. In conditions of like orientation, the job order became not a measure of labor, but a tool for "withdrawing" wages. At the same time, each member of such a brigade, having received his wages, acquires not a semi-finished product or an incompletely completed piece of work from the government, but actual material valuables.

The following contradiction lies in the fact that workers and technical engineers (ITR's), and especially foremen and those who produce the work, are separated with regard to wages, even though they work in the same collective and work toward the same result. The conditions for the payment of wages and bonuses for these workers are different. The technical engineering workers

now work on a time rate, and have little personal interest in the efficient organization of the construction process. The quarterly bonus is oriented on the trust's capital assets, which are formed according to cost indicators, and have little similarity to the results of the actual work done by the technical engineering workers.

An experiment was conducted in our sector on the section of organization and wages which is in the state of greatest disrepair, i.e., the line construction sector, where the greatest disparity between workers' and technical engineers' wages has developed, and where the most acute contradictions have been noted. As a consequence, this is the section where the line technical engineering workers tend to have the least motivation in achieving final results within compressed time limits or in improving efficiency in building production.

In the course of working on the elements of the incentive system, budgetary indicators were determined in real measures for agreements and unified job orders: the actual numerical strength of the workers, the overall total for straight wages and bonus money in the calculation for a single km of pipeline, the normative and by-the-job duration assignments for construction, and monthly assignments in real measures--in km of pipeline. In addition, the collective's obligations regarding reducing prime operating costs are worked out and included in the agreement, and the total bonuses paid out as a result of this reduction are also calculated.

The experiment showed that it was possible to link the organization of production and labor with the problems of socialist competition. At the same time, the agreement was turned into the labor collective's socialist obligations as well. Here, the obligations are taken on with an increased average assignment which is based on a strictly calculated normative base which takes the real production potentialities of the subordinate collective into account.

The adopted incentive system is simple and comprehensible, and makes a direct connection between the ruble and the km of pipeline which has been made ready for tests. The necessity for guaranteeing the completion of prescribed assignments for growth in labor productivity, for coordinating the growth rates of productivity and wages, and for reducing the prime operating costs are taken into account beforehand--when the agreement is being prepared and its indicators are being calculated. When the agreements are being concluded, these indicators are formed right in the flow-line production unit, and do not come down from above, from work which has already been accomplished, which is the traditional method.

During the course of the experiment, the flow-line production collectives were enjoined to complete their assigned pipeline sections in the shortest possible times, as not only did this reduction in the time spent on the operation increase the workers' straight wages, but all the workers' bonuses as well.

ST: What kind of normative base would allow the realization of the proposed system of labor incentives in the spreads?

V. V. Bakerin: The Methodological Instructions and Standards, which regulate the sequence in which spread operations are organized according to cost accounting obligation-agreements, with workers' wages paid by the terms of a unified job order, were developed according to Minneftegazstroy specifications. As far back as 1980, the "Statute On Lump Wage Payment for Workers Constructing Line Sections of Main Gas and Oil Pipelines for the Fulfillment and Overfulfillment of Monthly Assignments, in Real Measures" was developed and approved by the ministry. Practice has demonstrated the high level of effectiveness brought about through the introduction of this Statute. But the most important thing is that a normative base was established: the monthly output quotas for the production brigades and a normative lump wage payment system for the real measure. Kilometers of pipeline which are ready for testing were made the basis upon which the unified contract was drawn up and earnings distributed in the spreads. A substantial amount of help in developing the statute and the methodological instructions used to draw up the unified contract was given us by the Department of Construction, the Timber Industry and Construction Materials of USSR Goskomtrud [State Committee for Labor and Social Problems].

During the course of the experiment, the Center for NOT [Scientific Organization of Labor] and its normative research stations did a follow-up and monitored the work of the spreads in the new conditions. The stations helped the spreads in the monthly distribution of wages between the spread workers using the developed procedure and the prescribed accounting forms.

EKO: Specifically, what are the prime sources from which a unified job order is drawn up? How has the system of calculations been realized?

V. V. Bakerin: The unified job order is drawn up from two sources. The first is the piece-rate wages of the piece-rate workers, for whom the consolidated norm for a km of work was developed, taking the conditions on the right-of-way, i.e. its complicatedness with regard to the types of work to be completed, into account. The second source is the total wages paid to technical engineering and white collar workers. It has been made part of the unified job order based on official wage rates and the maintenance standards approved within the sector, as well as on the numerical strength of the line and equipment repair workers. The sum total of wages is included into the unified job order, with account taken of the standard for time spent on construction.

Thus, the unified job order which is distributed among the bonus sources separately for workers and technical engineers shows up as the original during the formulation and distribution of wages. The size of the bonuses awarded to the technical engineering is very closely tied to the spread's final work result. The more km's built by the spread in the least amount of time, the greater the total of bonuses paid out to the technical engineering workers. Initially, on the Urengoy-Pomary-Uzhgorod pipeline, a unified "extra earnings" coefficient was counted in, for laborers and technical engineering workers

alike. The sociologists pointed out the inherently defective nature of this approach, and finally two separate evaluations (per single km) were developed based on the workers' categories.

The entire system of these estimates is a simple one, and is carried out by the Center for the Scientific Organization of Labor in accordance with agreements with the construction organizations--the trusts, who are the clients for the flow-line production spreads. A single small booklet contains the statutes concerning the unified job order, the lump sum job authorization itself, the technical and economic indicators, the cost accounting agreement-obligations, the established time-table, personnel substitutions etc., which are all approved by the client, the administering trust, and are signed by the spread chief. The distribution of earnings follows in compliance with just a single wage requirement instead of the many hundreds of job authorizations as was the case in the past, and is completed once per month on a special document.

Yu. R. Anpilogov: The experiment has shown that the traditional indicators for value used to evaluate volumes of construction and installation work and marketable output are losing their economic meaning. It began to make no difference to the labor collectives how many millions of rubles' worth of construction and installation work they did, since current bonus payments are based on the completion of their assignments and obligations in real measures--kilometers of pipeline constructed.

In a different light, an acute problem presents itself these days--the problem of "so little money received". Not that it's "little", but how much they have earned. The money is always in plain sight, and every month the collective is advanced money from this total from the amount calculated for the completed kilometers of pipeline.

#### THE ADVANTAGES OF WORKING ON THE UNIFIED JOB CONTRACT

EKO: What are the advantages of the spread being paid according to a unified job authorization? How is the contribution of the individual figured into the overall results?

Yu. R. Anpilogov: Preliminary results attest to the fact that we have succeeded in providing a closer connection between the wages paid out and the amount of production completed, and at the same time to interest all types of workers in achieving their final results with the least material and labor outlays.

V. V. Bakerin: It used to be difficult to imagine the things that are being done these days: that the laundresses and janitoresses which are part of the spreads help in the loading and unloading work, which helps speed up the delivery of materials to the pipeline right-of-way. Before, no one could force them to do it, but now the job earns 160 r. People ask why a janitorress on a spread earns twice as much as someone with the same job outside a spread. As a matter of fact, she works twice as much--for the sake of the total result and the spread's earnings, and not just for herself. And herein lies one of the advantages of the unified job authorization.

I. I. Mazur: An evaluation of the work done by the excavator operators, the welders and the insulation installers does not depend on how much they have accomplished in their particular operations, but on the number of km of pipeline laid, and this has created a great amount of personal interest in the final result. Labor productivity has been sharply increased.

Item: On the average, pipeline spreads turn over 14 km of pipeline, ready for testing, per month.

Item: Individual subdivisions have reached the 20-25 km mark.

Item: Whereas it used to take from 400 to 500 persons to complete a comparable amount of work, it now takes only 220-230.

There has been a noticeable attempt to reduce the numerical strength of the spreads. This is explained by the fact that the "price" for one km of pipeline is indivisible, and the workers' personal interest is obvious.

Since everyone is working toward the same goal, the collective is united and acts as though it were a single huge brigade. It has been determined that it is impractical to have over 250 people in a spread. Spreads have varying degrees of productivity: some can produce 120 and others can produce 150 km of finished pipeline per year, depending on the right-of-way conditions. We have had to determine the optimal productivity so that exceeding it does not lead to a "swollen" spread. Let us assume that the figure is 150 km. Having determined this amount, we need to continue to optimize our resources, to reduce expenditures of them, and to determine our internal reserves.

V. V. Bakerin: The unified job order has not only connected all the links of the production chain, but has increased the motivation of the workers on the production brigades, the technical engineering workers and auxiliary service personnel in executing their assigned tasks with fewer people, as well as in the search for new reserves and reducing the expenditures of our resources. It might be well to point out that overall there has been a raising of the level of making up full batches of material and technical resources, and in providing the necessary work front for the technical engineering workers on the part of the trusts which are acting as clients, in accordance with the job order agreement-obligations which have been concluded. There has been an increase in the mutual exacting nature and in the overall responsibility for high quality and high-speed preparation of pipeline sections for operation.

Yu. R. Anpilogov: We believe that we have in some fashion "rejuvenated" the brigade contract. In applying it to the cost-accounting flow-line production unit, it lost its formality. It is an organizational base, and at the same time an incentive to have a cautious attitude concerning material resources.

Yu. R. Filippov: The flow-line production method of working and the enhancement of material motivation not only promote the attainment of high production indicators, but also lead to increased responsibility for each worker for the

results of the labor done in common. In my opinion, a leading role in this belongs as much to the contractual obligations of the spread collective to carry out a combination of jobs in accordance with the unified job authorization, with wages paid for finished kilometers, as to the system of wage distribution, taking into account the KTU [coefficient of labor participation] of each member of the collective in the overall work.

Being aware of the spread's monthly assignment and the daily output which has been specified for it, for example, a welding brigade presently fails to see the sense in working on far ahead of the insulating and laying columns, if the spread is only going to be paid by the finished km of pipeline, i.e. the amount of pipeline which has been welded, insulated, laid in the trench and backfilled. In our situation, the brigades are glad to help each other with equipment, with people and even with friendly advice. When they have completed their monthly assignment, everyone receives a bonus. However, when distributing the bonuses and extra earnings the Brigade Soviet and then the Spread Soviet consider the labor contribution of each worker, his attitude to the job and his labor discipline. The distribution of earnings by the brigade and spread Soviets is basically an expansion of the rights of the workers' collectives, and a deepening of the elements of the democratic spirit locally. At present, the collective evaluates the work of each worker, and this has tremendous educational import.

B. S. Vaynshteyn: The inclination to collective work is organically inherent to our people. As far back as 100 years ago, the famous Russian writer Mamin-Sibiryak wrote: "From time immemorial, the Russian has worked in association... outside of the association, the Russian....perishes."

The "association" means "people in reserve". Our flow-type production system, with its distribution of wages in proportion to the individual's work, is apprehended in this sense, I would say, with affection by the construction workers. The point here, evidently, is not just in the method of production, but in the psychology as well. The mutual help, the mutual support and the fairness on the level of the primary unit--this is where the moral strength of the spread is to be found.

Yu. S. Semenyuk: As the experience of our Spread No 1 shows, the collective spirit of workers of a variety of skills was strengthened. If previously they worked disconnectedly, then now they work together, like the fingers on a hand. We know for example that 19 km of pipeline are supposed to be finished per month. Our tasks are distributed around to everyone. No one supposes that he must weld 40 km of pipeline, but only 19 km in full. The entire complex of tasks for a given section is dealt with to completion. There no longer exists the problem of struggling to motivate the welders concerning the quality of their joints, as there used to be.

When determining the coefficient of labor participation we departed somewhat from the accepted method, and have defined an inter-brigade coefficient. There are brigades of excavator operators and insulators and several brigades of welders. The Spread Soviet sets their KTU's. The Brigade Soviet does not set the KTU for individual workers.

Ya.-S. A. Myakush: I have worked on V. Ya. Belyayeva's flow-line production crew since it was first organized. Our collective finished work on the Urengoy-Uzhgorod right-of-way six months ahead of schedule. We completed our section of the Urengoy-Tsentr I gas pipeline ahead of time as well. We also completed the Urengoy-Tsentr II. Right now we are working on the Yamburg-Yelets right-of-way. Of course the spread has a lot of good points and the collective works in friendly fashion. Anyone in need of help always gets it. For example an excavator operator will help a welder weld up a joint, or a welder will help give the excavator operator a hand in grading ground. Our KTU is set according to brigade, and that of the earth-moving equipment operators has been increased. I think a base KTU ought to be introduced for the brigade. It would be done this way: one brigade works very well, but another has decided not to hurry. So then you have to transfer people and equipment over to help the slow brigade out. With varying KTU's each worker receives the money coming to him, and people will think before leaving if they have friends on the spread. Wage-levelling wouldn't be suitable for us.

V. I. Satarov: Since the work is done on a unified job authorization, then it's a simpler matter to help one another. In the case of an equipment breakdown, a pipelayer can be made part of the column. If undercutting is needed somewhere, we use a bulldozer, without even asking the technical engineering workers for help. The brigade leader always meets us half way because we share common interests.

This community of interests has led to the elimination of the gaps in the work-rates of, for example, the welding and the insulating operations. Accordingly, the difference in the wage rate has also been reduced. Concerning the KTU, the scope set for us of 0.5 to 1.5 would have to be expanded. Everyone can see that the welders have to do the most labor-intensive job. Meanwhile, the pipelayer operator has the greatest KTU (1.4). In the winter, he's in where it's warm, but the welder is in the snow; in the summer the operator wears special work clothing. At times the machine operator's wages are higher than those of the welder. This inequity ought to be eliminated, so that more normal relations can be achieved within the collectives.

V. V. Bakerin: In our document on the setting of wage scales for various categories of personnel we tried to use equalizing coefficients, for example, 1.5 for welders at 1.4 for machine operators. However there still remains disproportion. The point is that the wage rate for a heavy-equipment operator is 95.5 kopecks, but only 79 kopecks for a welder at the same skill level. Even a supplementary payment for injury made when equalizing the distribution of wages does not compensate for the welder's working conditions, which are more severe than those of the machine operator. We suggest that if the ministry is capable, it expand the scope of the KTU from 1.2 to 1.7, or we will work out other sources.

B. P. Kutyrev: The system of wage distribution using KTU should possess great flexibility, as should the procedure for correcting the collective forms of labor organization. From my point of view, the principle by which the KTU is calculated is faulty. The method for distributing the wage fund which is separated for the collective, and which takes the coefficient of social participation into account, seems to be sound. (This method was covered in EKO, No 11, 1983).

G. I. Shmal: There are still a number of problems associated with determining each worker's labor contribution, and these problems need to be studied and resolved. For example, equal pay is not always earned for equal labor. Consider, for instance, maintenance personnel. Mention has already been made that janitoresses who work in flow-line production units which operate on a unified job authorization make twice as much salary as her colleague who works in a collective which does not operate on a unified job order. But this, as they say, cuts both ways.

Yu. S. Semenyuk: Dealing with allied workers is a complex problem. They say, "You make a big salary--so work more."

I. I. Mazur: Yes, the workers in allied trades, the road-building and production engineering subdivisions, who participate in the overall process and reside in the same settlement as the flow-line production unit members. Often, two construction superintendents live alongside each other in the same little railroad car, and one of them, who works on a spread, makes 450 rubles and the other makes 180. We have found no way of attracting subcontractors by which everyone can make an equal salary for an equal amount of work. There arises a natural disparity. In the flow-type production unit, for example, there is no shortage of technical engineering workers or of skilled workers. In the allied subdivisions, this is a real problem. If the need appears in the flow-type production for a worker or a specialist, then a worker quickly comes over from an allied subdivision.

#### THE ENGINEERING AND TECHNICAL WORKER IN THE SPREAD. THE INTRODUCTION OF NEW EQUIPMENT

EKO: Inasmuch as in our day the widespread introduction of scientific and technical achievements in production has become the basis for effective development, there is an extraordinary increase in the role played by the scientific and technical engineering workers in the speed up of scientific and technical progress. How are the functions and the efficiency of the work done by the engineering and technical worker changing in the spread? What have been the consequences of the special features associated with paying for their labor in the spread? Will they promote a speed-up in scientific and technical progress?

V. I. Satarov: For the first time, the engineering and technical workers in the spread have felt the attention being paid to themselves and their salaries. It used to be that the duty supervisor was always with the brigade, and made a salary of 145 rubles. Today, those earnings have been increased, and at the same time, this has resulted in increased motivation regarding the finished output. And it goes without saying that personal responsibility has increased.

Yu. P. Filippov: The idea of including the engineering and technical workers, the repair workers and the special transport equipment operators into the lump-sum job authorization has proved itself.

While issuing the piece-work assignments to the flow-type production units for an extended period, with the previously set cost of one km of pipeline, we, in doing so, liberate the engineering and technical workers from their monthly dealings with the job authorizations. The engineering and technical workers thus have more time to take care of technical problems. The coefficient of labor participation system, being an effective tool for the setting right of production and labor discipline, forces the engineers to think creatively, or to give skillful guidance to production.

I. G. Shaykhutdinov: At present, we have no unified job authorization in our spread. And this is unfortunate. Of course the workers have lost nothing. On the other hand, the technical engineers.... The unified job order and the increased wages were deemed necessary for the supervisor, who gets up before, and goes to bed after, the workers, and whose wages are considered small, considering the conditions on the right-of-way.

A. A. Serdyukov: The unified job authorization has influenced the souls and minds of people and has affected the mutual relations between the rank and file workers and the engineering and technical personnel. I recall the way it used to be when a foreman earned 145-160 rubles. He would give out the job order and the electrodes and then left. Now, he's always where the work is being done. The workers see the concern of the engineering and technical personnel.

The unified job authorization has truly organized the collective. I am speaking on behalf of the flow-type production unit when I say that the unified job authorization ought to be continued, and even improved.

I. I. Mazur: In a flow-type production unit using a unified job authorization, the question of wages will no longer disturb the engineering and technical personnel. Their sole interest will be in kilometers of pipeline laid, which naturally will also determine their wages. They will be thinking of ways to mobilize the workers toward carrying out the assignment, how to use their engineering know-how, ability and skills, and how to apply them so as to reduce the number of workers needed, and to reduce the time needed for construction.

B. P. Kutyrev: Based on the role of the engineering and technical personnel in the production process, I consider the separation of funds for the engineering and technical personnel and workers to be a faulty practice, one that underscores the disparity of their contributions to the final result. Generally speaking, do you think you could separate one's head from one's hands? Since the output is turned over by all categories of workers, the funds ought not be separated, but improved. All the more so, inasmuch as the experiment also poses the problem of wiping out social differences. The overall result needs to be increased, and the distribution of wages ought not appear as though one person is taking from another. Each worker ought to be paid what he has earned.

A. D. Khaytun: But how is this to be actually accomplished? From my point of view, the separation of wages, as set up in the experiment, is very important. At the first stage of the experiment, when the wage fund was unified, it seemed to some of the workers that the engineering and technical personnel were "taking wages from their pockets", which was not true. Unfortunately, these stereotypes become established when a worker believes it to be perfectly natural for his wages to be two or three times as high as those of an engineer. Stereotypes of thought take a long, long time to be extirpated. The separation of the wage fund, as in this case, acts in a positive direction. Life itself will show us what happens further down the road.

V. V. Bakerin: The tie-in of paying bonuses to the engineering and technical personnel with the final results has already been noted. The awarding of bonus payments to engineering and technical personnel has been made directly dependent on their organization of the collective's efforts. It might be well to point out that the number of managerial personnel has been markedly reduced, and can be reduced even more.

I. I. Mazur: I should like to emphasize that the role and the responsibility of the supervisor in the cost-accounting flow-type production unit has increased greatly. At present, the flow-type production unit chief is the main boss, and is a conspicuous and important figure. When, for example, conference calls have to be made, the presence of the flow-type production unit chief completely suffices for resolutions to be adopted. When a flow-type production unit chief makes a conference call report to the ministry, none of the complaints are raised which heretofore would have required resolution by the manager or his deputy, the great leader who would be found at the site, and would have organized the operation.

Yu. S. Semenyuk: The advantages gained by using the flow-line method for construction work are obvious. It is very convenient for me, as chief of the spread, to guide all the work being done on the right-of-way. Within the spread (and we are at work on a complex section), we have concentrated a great number of technicians. Putting this operation into the hands of a number of different people, would greatly complicate the carrying out of the totality of efforts in short time periods. I can easily manage the workers of an earth-moving brigade, or welding brigades. We concentrate our equipment where we need it. We use our own men to carry out some of the underwater technical efforts. We place a lot of emphasis on using new equipment. For example, we have introduced the Sever resistance welding unit, which is giving an excellent account of itself, as well as some efficient equipment which we use to monitor the quality of welded joints. I believe that our spread structure, along with working on a unified job authorization both work to promote the introduction of new equipment.

I. I. Mazur: It seems odd to issue Styk and Sever units to the welders, who already earn a good salary and always complete their work ahead of schedule. It's like there is no point in giving over a total volume of running footage to be done with a machine, which itself is being put over on jobs less profitable than those it used to do, and which are more labor intensive. This factor is no longer operative in a flow-type production unit. The most import-

ant thing in the flow-type production unit are the finished km of pipeline, and not the number of welded joints. And now it is profitable to use machines for welding, since it cuts down on the overall number of employees, and the welder will be doing more labor-intensive operations with no loss in wages, and at the same time will be raising his skill level.

I. G. Shaykhutdinov: The unified job authorization not only stimulates the introduction of new equipment, but stimulates the men to put it to better use. The efficiency of machines and mechanisms is terrific. In our spread, we carry out earth-moving and insulating operations around the clock. And since we practice land restoration, the site stays clean after we've gone on.

#### THE PROBLEMS OF IMPROVING PLANNING AND ADMINISTRATION IN PIPELINE CONSTRUCTION

ST: The experiment in using a spread as part of the program to improve the economic mechanism within the sector, along with providing a great number of positive factors, has engendered certain negative phenomena as well. Which contradictions might be mentioned, and what is needed to eliminate them?

L. M. Chernyak: Perhaps the greatest complications caused by the new system of wage payment on a unified job authorization came as a result of its divergence from the extant planning system. According to the decrees now in force for the trust and its subdivisions sets the standard for wages per ruble of work volume. The experiment uses another standard: per single km of pipeline laid. This brings about very serious discrepancies which cannot be overcome, either today or, very likely, in the future. Not all the operations connected with laying a pipeline can be measured in kilometers (for instance the work done in building storage facilities, the approach roads outside the right-of-way, incoming control of materials etc.). The result of this is that allied subdivisions have not been brought over to the unified job authorization, nor have the preceding engineering preparation of the right-of-way or the road transport operations. Moreover, in a number of cases, the above-mentioned operations are executed for outside organizations. Thus a standard km does not allow account to be made of all the other types of work, outside of basic production operations, such as trenching, welding and insulating. This is the contradiction between the existing arrangement for payment of wages and the conditions in which the spread operates, and which has caused a number of negative results.

Yu. R. Anpilogov: According to the existing arrangement for establishing and planning labor indicators which express value, these indicators come down from above and are the same for the ministry, the main administration, the trust and the administration as they are for the brigade, even though the scope of the problems and operations on the level, say, of the trust and the brigade, are considerably different. Essentially, this is not in fact planning either, but rather numerical distribution, by which the indicators are then "stored" in the accounts and analyses on all levels. In this connection, distribution in the absence of technically validated normatives, based on what has been accomplished, is frequently based not on a business-like approach, but on a quantitative, random approach. Might I also be allowed to talk as

well about the seriousness of the presently ubiquitously prevalent method by which a brigade's technical and economic indicators are analyzed in evaluational expressions in conditions, when, in comparable periods of the existing arrangement by which prices are formed and estimates are drawn up, the structure of the operations changes, as does the conditions in which they are carried out, and where costs are laid on in the drawing up of authorized and registered completed jobs, regardless of the extent of the labor contributed by the lower-level collective.

B. S. Vaynshteyn: Unfortunately, these days the construction industry is witnessing an acute conflict which has developed between the flow-type production unit and the economic mechanism, where "production volume", i.e. the instrument used by the forces of inertia to control scientific and technical progress, dominates everything. Any compromise is impossible here. Or this "gross production" will once and for all be abolished as an evaluative index or as a basis for determining the wage fund, which will then open the floodgates to collective productive labor, or the "gross" will be preserved under one or another pseudonym, at which point the spread will collide with the barrier retarding scientific and technical progress.

L. M. Chernyak: This is all true. But we need to bear in mind that even when using a new system, we needn't slow down the pace at which we lay pipeline, which speed was achieved by flow-type production units prior to the changeover to the unified job order, nor do we need to lower the use of capacity of the balance of the work time, or the level of meeting the output norms etc. In any case, the main requirement has to be observed: that growth rates in labor productivity outstrip those of the average wage. Should this requirement go unobserved, we will come up against serious contradictions. Checks within the flow-type production units have revealed that there have been instances where wages increased during reductions of labor productivity. And an artificial increase in the wage fund was brought to light, just as for the quota for ordinary workers and the engineering and technical personnel, respectively. Wages paid according to a job order, even a unified job order, do not rule out padding.

S. B. Kibalov: How can it be that labor productivity fall off when working on a unified job authorization, but wages go up? As a matter of fact, it's distinctly worded in the job order: so much done, so much paid out. Or has the job order been incorrectly drawn up?

L. M. Chernyak: Yes, in a number of instances the job authorization forms were drawn up incorrectly and the initial data accepted for the estimates were reduced. In other words, the overexpenditure was already put in when the job orders themselves were being written up.

Ye. B. Kibalov: You are maintaining that the output achieved during the initial period can be reduced when working on a unified job order. However, at that time, it was being measured in rubles, whereas now it's measured in kilometers.

L. M. Chernyak: The main planning administration evaluated it in km as well. In a number of cases, as the job orders were being issued, the output was reduced in precisely those real indicators, thus permitting an artificial wage increase. As a result, in one of Glavvostoktruboprovodstroy's [Main Administration for Pipeline Construction in the Far East] flow-type production units, in the first quarter of 1984, production in real indicators showed an increase of 20 percent against the first quarter of 1983, decreased by 8.4 percent in terms of cost, with an average wage increase of 45 percent.

Yu. R. Anpilogov: In an analysis of the work done by Glavvostoktruboprovodstroy's flow-line production unit, which administration was mentioned by L. M. Chernyak, unfortunately did not take the considerable shift in the structure of the operations, the difference in the price of imported insulated pipe and domestically produced pipe or the fact that there was no comparison in wage outlays into consideration during the periods being compared. On the whole, the operational totals, for example on the Urengoy-Tsentr-I right-of-way, point to the fact that labor productivity in all the flow-line production units which were part of the experiment, exceeded the wage increase by a wide margin, both in real indicators as well as in terms of cost.

Generally, when using a unified job authorization, the result is that there can be no overexpenditure of the assets used for wages in a flow-line production unit. The total for the job order is calculated according to the effective norms, and the total is objective as well as unchanging, and can be adjusted only in connection with unforeseen circumstances or for conditions similar to those provided for by the individual total, but no greater than it.

Yu. P. Filippov: We have in fact gotten rid of upward write-ups, and this is quite important. Additional job authorizations are practically never made up, and if they are issued for unaccounted-for jobs, then this is done only on a formal document, which is approved by the trust's chief engineer. Work quality has been improved. Bonuses are paid out only for work which has received marks of quality of "very good" and "excellent". It would be difficult to overrate the new system of organization and wages. It needs to be strengthened as soon as possible with the approval of the highest agencies, and given legal standing.

A. M. Mikhaylichenko: If, according to the administration, the growth rate for wages amounts to 6-7 percent, then that for the flow-type production units comes to 2-2.7 percent. It is obvious that not only do we need to continue the experiment, but we need to give it a legal basis, and the questions of developing the trust apparatus cannot be left unattended, either.

L. M. Chernyak: The system has to be improved. A new economic mechanism needs to be introduced overall. A stable construction conveyor can only exist when it has all its parts: planning and evaluation of its operation, wages, a system wherein the partners interrelate, and all parties are responsible. Unfortunately, we have not accomplished this, and that is also why we have encountered flaws and discrepancies.

EKO: Which of the new economic mechanism's elements have not paid for themselves? What needs to be corrected in existing economic practice?

L. M. Chernyak: In the first place, there were disparities in the level of the wages paid to the subdivisions which were, in a strict production sense, connected to a flow-type production unit. As a result, we do not obtain finished pipeline on time. Little of it is laid or backfilled, it needs to be tested, and we need to have the confirmation of a formal document from a state commission corroborating that a marketable construction product does indeed exist. We have set up allocations and incentives only for those brigades which handle the basic types of work, but have developed no incentives for those collectives involved in road construction, pipe delivery, overweights etc. That is why it takes longer than it should for us to achieve the final result, and we also do not effect the required saving in material and financial resources, i.e. the final economic effect. There is an effect, but as yet it is not maximal.

In the second place, the trust organization has not centralized a series of control functions where it is located, which is why it is not motivated to achieve the final objective. The flow-line production unit is forced to carry out a large part of the work associated with static accounts, orders for material resources etc. The volume of this sort of work has sharply increased, compared to what it used to be.

G. I. Shmal': The flow-line production crew is the unit directly involved in production, and which must be directly involved in executing the production assignment. Regrettably, these days the flow-line production units' managerial personnel, who have been cut back quite a bit, are charged with operations not envisaged for them. They have to draw up time-tables, write out requisitions etc. We need to think of a way to liberate the flow-line production unit from the stream of paper work. The trusts need to take upon themselves the problems of planning, supply etc.

A. M. Mikhaylichenko: Three years ago, the trusts carried the entire burden of the spreads on their shoulders. After a year or two they'll be adding their concerns about the control of mechanization. This, as well, is the kind of structural subdivision which doesn't have their own balance, but merely keeps a current account. Meanwhile, the trust preserves its regular time-table. This, too, serves to hinder its achieving the result we had planned.

I. I. Mazur: The intention was for the trust to coordinate the allied trades, to resolve planning affairs and to handle supplies. But such was not the outcome, primarily because the trust had no interest in this and so remained with the previous organization and its functions, and no one relieved it of a thing. Although in the context of the experiment, wages for the staff, the supervisors and the specialists who were called to work on the flow-type production unit could have been raised by 10-15 percent. The trusts solved the new problems only to a partial extent, such as when the supervisors showed enthusiasm in so doing. Since the responsibility for a number of managerial tasks was handed over to the flow-type production unit and the general contracting subdivision, the engineering and technical personnel, in spite of

the suggestion that they would have more time to put into production and into improving its efficiency, are wallowing in paperwork. Consequently, there is a need to up-date this network either by increasing the trust staff, by improving its motivation toward its job or by the flow-type production unit retaining the construction and installation administrative functions for itself.

L. M. Chernyak: The general direction taken by this restructuring--changing the planning system, which should, in all the subdivisions, be oriented toward the final result--consists in finished and tested pipeline, complete with the authorized formal commission document. All the production and associated subdivisions, as well as the trust staff, need to be tied to the finished product. We need a corresponding system of planning and evaluative indicators oriented toward the achievement of the final effect by all those taking part in the construction effort, and a system of mutual liability, so that the guilty party compensates the losses of his partner who has lost time, and who has been shut down through no fault of his own, thus tying them together through their strictly economic and material interests. In other words, a distinct system of contractual relations, both vertical and horizontal, needs to be brought into being. It is for this reason that the trust staff needs to be brought into the experiment, so that it can take planning functions, supply of materials, paperwork etc. upon itself. The trust's employees should treat the work of the lower-level links as a vital concern.

Yu. R. Anpilogov: It is apparent that the principles of offering incentives to the workers, which principles have made a good showing of themselves in the productive sector, should be further developed in the sector's pipeline-constructing trusts. There is a need for a unified system of motivating the workers of all the subdivisions involved in the production process, including the staff of the pipeline-constructing trust.

Pursuance of this experiment has permitted conclusions to be drawn regarding the need to develop systems for lower-level planning in real indicators, the accounting for outlays, all oriented toward the consolidated lower-level cost-accounting collective.

G. I. Shmal': The ministry has developed and approved new guidelines regarding new management methods, aimed at speeding up the construction of main pipelines. These guidelines also regulate relations between all those participating in flow-line construction, even though it is clear that the process of improving them must continue. In passing, there are plans to use these guidelines to introduce systems of natural and cost indicators which are more fully oriented toward the final construction product, which reflect the contribution of each worker who participated in its construction, and which take into consideration the problems associated with improving planning calculations etc.

L. M. Chernyak: The ministry has prepared proposals regarding an experimental check of the new management procedures for the pipeline construction trusts for which permission must be obtained from USSR Gosplan's Interdepartmental Commission. They will be tried out in several trusts, and this will permit a more complete and integrated introduction of the new management procedures in the sector's construction organizations.

ST: How, specifically, can the sectorial institutes render aid to the production workers in solving the problems of bringing about improvements in administration and accelerating scientific and technical progress?

B. S. Vaynshteyn: I believe that our institutes--VNIIST [All-Union Scientific-Research Institute for Pipeline Construction] and NIPIorgneftegazstroy [Scientific-Research and Planning Institute for Organizing Oil and Gas Industry Construction] are not in existence merely to stand on the shore and give advice to the production workers, who are laying new pipeline routes in an ocean of scientific and technical progress. They have been charged with making themselves a direct part of the economic administration system, and with demonstrating, by their example, even if only by a single example, how to bring the tremendous potential of new technology to light.

Let us recall the prophetic words of V. I. Lenin when he said that the economist ought always to look ahead, in the direction of technological progress. Today this means that economists must be the lookouts regarding state-of-the art technology, and they also have to pave the way for the outstanding production workers.

I suggest that each of our institutes be included into the system of each trust, and that the institute take upon itself full responsibility for the results of its work and finally that they demonstrate by their deeds, what the mechanism for the economic and social administration of scientific and technical progress in gas and oil industry construction ought to be like.

EKO: What is the role of stability in the cost-accounting flow-line production units in realizing the production programs? Will this stability always be maintained?

Yu. R. Anpilogov: It is important that we mention that the following positions were made part of the experiment's program: payment of wages based on the final product, workers' incentives based on the completion of specific assignments in natural measures and distribution of wage assets through the use of the coefficient of labor participation--and can be effectively realized only when we find stability in the lower-level collectives, and when they have been given rights and responsibility.

At the present time, there has been no provision for the right to a stable staff, or to stability in the work program for the labor collective. In practice, the problems of organizing flow-line production units and brigades and setting up their workloads have been solved by management, frequently with no long-range planning and influenced by operational necessity. Even in the

presence of contractual obligations, the conditions necessary to carry them out are not created for the collectives, within the framework of the brigade contract, and in many cases contract brigades are disbanded and transferred to projects not provided for by cost-accounting agreements.

The solving of problems associated with the endowing of the lower-level labor collectives with the right to stability is an urgent measure in the effort to carry out the statutes of USSR Law On Labor Collectives, and will permit maximal realization of the advantages built into the structure of the consolidated collectives, and which are directed at the finished product.

EKO: Which are still the most acute problems connected with planning and administration which have arisen during the course of the experiment?

G. I. Shmal': Organization of the spreads made things such as the minimum two-year planning period, which had to be continuous, even more acute for the agenda. We no longer have to deal with this period, neither in the fields or on the construction projects. The flow-line production unit completed one project and had to move on to another, and we were not prepared for this.

And further, how is one to motivate the workers to high quality in their work? You cannot pay the same wages to sixth-class welders, if one of them is an "ace", and quality of the other's work is somewhat lower. Obviously, correction factors of some sort are needed. There are also the problems of complete sets of equipment.

V. I. Satarov: Complications arising from getting equipment in complete sets hinder the more result-producing efforts. We workers understand the need to increase production efficiency, i.e., to speed up the construction process, but we do not always have the opportunity to meet our increased obligations. For example, a section of the Urengoy-Tsentr II right-of-way which we completed in June was not accepted for testing until October 1984 because there was no equipment. Naturally the workers, who had to be transferred to another pipeline, held back on completing this section. The result was that we worked without a unified job authorization on the Kholmogory-Klin right-of-way, since we had no clear-cut plan.

V. V. Bakerin: More emphasis should be placed on economic studies, especially for flow-line production unit chiefs. We also need to learn how to inform each worker of and bring home to each worker the virtues of work done by the cost accounting method and the advantages of the unified job authorization.

#### THE SPREAD AS AN ORGANIZATIONAL STRUCTURE

ST: The origination of a new type of lower-level organizational-production structure, as is the integrated production flow-line unit (spread), has also posed a number of fundamental questions in the areas of production, technology and organization in the construction industry. What is the main principle behind the organizational structure of the spread?

V. A. Alyutov: It is a well-known fact that the construction industry is an industry of chance, especially pipeline construction. An alteration in the objectives of, and the conditions in which the construction industry operates, require organizational restructuring, as well as changes in the production process, frequently profound changes.

Moreover, a construction and installation organization strives, as a system, to preserve integrity and stability. Were this contradiction to be ignored, it would lead to a situation where, by way of a gross evaluation of their work, the builders would be protected from the clients' changing demands.

On the other hand, the disposition of the construction and installation organizations and their production potentialities frequently come to the fore as the main factors in the disposition of construction projects and in the planning resolutions designated for the construction of the projects. The positive solution to the indicated contradiction, which was found in Minneftegazstroy, lies in the setting up of goal-program production structures, such as the flow-type production units are.

EKO: How was the most favorable spread structure obtained? What is its basic advantage?

M. P. Karpenko: An original theory of the use of flow methods in pipeline construction was needed to substantiate a most favorable structure for the production spread. Our understanding of the use of flow methods is that it is synonymous with conveyor production. The construction flow-line differs from the industrial conveyor only by virtue of the fact that pieces of work are moved around on the conveyor, but people with tools remain in place, and in a flow-line production unit it's the other way around--the pipes are in place and the people move around with their tools. In return, the main features in the conveyor system and in the flow-line production system are identical: with regard to space, they both use direct flow; with regard to time, they both offer smoothness of operation. These are precisely the features from which the main advantage associated with the flow-line form of labor derives: the simplicity of control which makes it possible to avoid non-productive time expenditures, provides ease in monitoring the entire production process, and makes it possible to take prompt measures to make up for the effect of destabilizing factors. Flow-type production is a form of production which possesses these features and is therefore simple to control.

The first thing the sector developed was the equipment and technology to make possible the construction of variable-diameter pipelines at high rates of speed--up to 1-1.5 km per day.

By breaking up the process of pipeline construction into individual technological operations, by having put a specialized brigade on each of them and by having synchronized their efforts and by having united the brigades with a unified operative and administrative leadership, we obtained the production flow-line, which is simple to administer, and is essentially a self-controlling lower-level construction subdivision.

ST: Simplicity of control is one of the manifestations of the flexibility of its organizational structures. In what other forms does this simplicity express itself in spreads?

V. A. Alyutov: The spreads, as goal-program structures, are formed on the basis of the resources of the construction and installation organization (the trust), and operate while resting on its stable nucleus. At the same time, the construction and installation organization preserves its own stability, which is primarily the stability of the collective, and compensation for changing demands and the satisfying of new ends is insured by the goal-program structures, which can generally be temporary. The experiment confirmed that spreads, which operate in varying natural and climatic zones, and which erect pipeline sections which have outstanding design characteristics, have to have differences in their organizational structure, their standard complement of equipment and in the production methods which they use. Moreover, appropriate changes in the method of production, in organization and administration need to be brought in on a regular basis in proportion to the appearance of new tasks and the changeover to new conditions for construction. This capability for flexible adaptation is provided by way of supports for the stable portion of the construction and installation organization. This is why the spreads cannot exist without their close connection with the maintenance and auxiliary departments, and constant maneuvering by the resources within it as a unified organization, but the excessive autonomy of the spreads unavoidably leads to the loss of its main advantage: its flexibility.

EKO: How does the sector solve the problem of providing the spreads with a future front of operations?

M. P. Karpenko: If you consider that the spread is supported on three whales [na trekh kitakh], and that one of them is the equipment, production method and the organizational structure of the spread, the second is the economic mechanism, which includes the organization of wages, and the third is the uninterrupted provision of the front with an operational front, or in other words the development of an operational time-table for the front for a sufficiently distant future.

The latter item seems very important to us. Of course, if there is a single spread in the trust, and all the rest of the work is done by traditional methods, then it's an easy matter to provide this spread with an operational front. But if the trust's entire construction program is carried out by spreads, then it must be stable and certain for no less than three years ahead. And this depends on the planning done in the main production administration. And for the main administration, it depends on the sectorial planning. As you can see, we are rapidly elevating ourselves to the level of an administration. The result is that in order to provide work for the lower-level construction subdivision--the spread--a decision has to be adopted on the level of the sector, the client ministries and USSR Gosplan.

This is how we have proceeded in our ministry. At first we had to develop a complete construction program for the sector and the client ministries, and then, subdividing it, bring to the main administrations, trusts and spreads.

We have passed the initial stage, and as the first among the other construction sectors, we have developed a construction program with a breakdown for each year of the 11th Five-Year Plan period, and we already have a plan in hand for our construction program for the period of the 12th Five-Year Plan. But this program should be coordinated with the organizations who supply our pipe, materials and products, balanced with the construction organizations' production capacities, and what is most important, should be optimized with regard to the use of its own capacities. From the purely scientific point of view, this problem is far from trivial; it is a combinatorial problem in the six-dimensional space of variables.

The development of the construction program makes it possible to move on to the next stage, i.e. the development of time-tables for the long-term spreads. The spreads are equipped as required, have a permanent work-force and are provided with manufacturer's registration certificates, and should be able to handle the entire spectrum of pipelining projects under way in any given region, no matter what the diameter or the natural or climatic zone, from quite long pipelines to short branch lines. Correspondingly, the spreads should have varying capacities and degrees of mobility. We have already initiated this effort in conjunction with Glavtruboprovodstroy [Main Pipeline Construction Administration]. During the changeover to permanent spreads, changes will have to be made in the entire organizational structure of the subdivisions and enterprises, as well as in the course of planning their activities. In connection with the increased productivity of the spreads, we will obviously see a reduction in their numbers. And here, cost and natural expressions of the volume of work in the main administration will of course grow.

We believe we are on the right path. The spreads have already proved their effectiveness.

V. A. Alyutov: I would like to emphasize that the continued development of spreads, in that it is an indispensable step, suggests a changeover to planning the organizational structure and to estimations of productive capacity. The goal-oriented installation of the construction and installation subdivision can be translated into concrete organizational and production-oriented solutions only through the use of planning analyses. Designs, being the technical and economic grounds for the most expedient production and organizational resolutions of a construction and installation organization, should serve as the basis for their legal registration. Type designs, which are acceptable for use in extensive construction, and which are the standard organizational norm, are unsuitable for this purpose.

The urgency of the problem of project planning for construction and installation organizations has been more and more vigorously emphasized in recent years, but it's solution is linked to assimilating the experience gained in the industry. This, in our view, is an inefficient method. New project planning methods, now being developed in the sector, are needed.

EKO: Which administrative schemes are most efficient for spreads? Specifically, which structural subdivision should the spread be a part of?

G. I. Shmal': One of the tasks for the experiment is to precisely define an administrative structure for pipeline construction. The spreads, for instance, are part of the trust, with other organizations brought in, based on the legal rights of the participants. At present there exist spreads based on integrated construction administrations. There is and there has been a plan to organize the spread as an independent structural unit according to the legal rights of the construction administration, having taken its planning and accounting functions etc., away. However this has not resulted in full measure. True, it has come about here and there all the same. Some people believe that the spreads, resting on the integrated construction administrations, work best of all.

Yu. R. Anpilogov: The experience accumulated by the spread collectives in the course of the experiment has shown the specific advantages of any given stage of the development of line construction of the more flexible structures--spreads which belong to the integrated pipeline-building administrations.

V. A. Alyutov: It is obvious that the organizational structure of the spread cannot be approached in the same way as the structure of an SMU [Construction-Installation Administration]. They are in the process of realizing radically different approaches.

V. I. Satarov: Our spread works on the basis of an administration, not a trust. I consider this a more tolerable alternative. An administration is directly interested in the success of the spread's work, and it has its own repair center, and its repair service is better organized. When subordinated to a trust, complications would arise with the arrangements for the living conditions. An administration has its own group of builders who take care of that. An administration always has a substitute available from the qualified welders (of which there are plenty) to fill in for summertime vacations.

I. G. Shaykhutdinov: Things are going satisfactorily for us right now. I am in favor of the spread subordinated to a trust. If it is given over to an administration, then you begin to have wage problems.

Ya.-S. A. Myakush: We had problems with equipment repair. There were no repair shops. There weren't enough skilled specialists in the repair brigade. But an administration has a repair center, repair shops and fitters. So the spread ought to be subordinated to an administration.

V. V. Bakerin: In our opinion, operating with cost-accounting spreads paid according to a unified job authorization, such as belong to the integrated pipeline-construction administrations, turns out to be most efficient. The administration's structure permits the creation of the needed conditions for the larger lower-level subdivisions, which work toward the final result, to work efficiently.

A. P. Vesel'yev: Further improvements are needed in the structure of the spreads. But it isn't only the spreads' structure that needs to be changed, but that of the trusts, as well. But how is one to change the structure of the trust so that it is flexible, and operationally restructured in accordance with the conditions of the territory and the special construction features of these or other main lines, and so that the program's production collectives are set up for the time during which specific operations are completed?

Today the trust is supporting its program, and half of this effort is being accomplished, we suggest, thanks to a single spread, but this very spread is working on a single high-capacity gas pipeline right-of-way in a single corridor wherein no relocation will be needed. But soon projects will show up for the spread in Central Asia, Eastern Siberia or in the Ukraine. As a consequence, a trust has to be maneuverable and mobile in order to achieve stable efficiency in its work. The directors of the basic administrative link--the trusts--and the directors of the production collectives, are constantly talking to us about increased mobility. In my opinion, we have had inadequate comprehension of these problems, and we have a lot of work ahead of us, including that involved in the science of this sector.

#### **THE EXPERIMENT'S PSYCHOLOGICAL ASPECTS. SOLUTIONS TO SOCIAL PROBLEMS. IDEOLOGICAL SUPPORT OF PIPELINE CONSTRUCTION.**

ST: The attitudes of the experiment's participants themselves, as well as their estimation of its significance, are extremely important to the development of the experiment and the subsequent widespread utilization of its results. What did the sociological surveys show?

A. D. Khaytun: As is common knowledge, social problems came to light very acutely in the experiment. Based on this information, a major sociological investigation of the spread collectives was organized wherein during three years, over a thousand questionnaires and interviews were obtained. Some of the spreads were examined three times each. It turned out that even though over 80 percent of the workers were in favor of the experiment, there was no unanimity. As a rule, it was the highly-skilled workers, for example the welders, who were dissatisfied, and to a certain extent lowered the relative level of their wages throughout the collective. However, it should be taken into consideration that dissatisfaction does not lead to an increase in the potential turnover of the workforce. On the other hand, the stability of the collectives overall and for the above-mentioned group has increased. In the second place, the factor of stability in the worker's living conditions, in addition to his salary, is very important for the long-term future.

In one of two comparable spreads, the wages were 15-17 percent higher, but the negative evaluations were considerably more forceful. Moreover, a trend has been observed toward less favorable evaluations in the spreads which have had increased wages. The reason for this is that one spread was organized quite a while ago, and its framework and administration are essentially stable, and the collective is certain of its future. The other spread was made up of a variety of collectives and for the majority of workers the long-term prospects--where they will be living and working--are vague. This is the

Thus the present attempt to make very high wages with no concern for the future. So the factor of the continuity of the experiment's conditions, and the stability of the organizational structures is, perhaps, one of the most important social prerequisites for the success of this or similar experiments.

EKO: Social and psychological factors exert a tremendous influence on the improvement of administration and on the interaction of the people in the production process. Practically all those who took part in the round-table discussion shed light on the psychological features of the activity of the collectives during the time they were working on a unified job authorization. Which other of the experiment's psychological aspects are of interest?

V. K. Kashin: I would like to mention that the improvement in the psychological climate and the mutual help are both the result of, and the method by which the high economic and social effect were obtained from the changeover to the unified job authorization. The involvement of the psychological mechanism in production work--the task of the administrator and public organizations--calls for a shift in the style of leadership toward democratization in the work situation of the collective on a unified job authorization.

The spread collective is characterized by its relative social reserve on the whole, and by the remoteness of the brigades to each other on the job. In a collective such as this, all the social and psychological processes take place considerably more intensely. The emergence of a feeling of comradeship and mutual helpfulness is more forceful, and the feeling of injustice is stronger as are any conflicts which appear. An account made of these features in the activity of a supervisor has a considerable influence on the effectiveness of the collective's work.

One paradoxical, at first glance, situation was brought to light: in the organizations wherein explanatory efforts were made to the personnel during the period of transition to the unified job authorization and the collective remained more stable and forms of self-administration were more developed--the supervisors demonstrated a lively interest in the sociological inquiries; in contrast, in organizations where there were a higher percentage of negative responses regarding the unified job authorization for the spread, and where personnel turnover was higher, the supervisory personnel evinced no interest in the inquiries. Further comparison showed that, as a rule, a high degree of efficiency, stemming from the introduction of the unified job authorization, was achieved in the organizations where the supervisors were known for their attention to the collective and to people.

ST: Considering that the proper approach to solving these psychological problems lies in the great, and insufficiently utilized, reserve for increased production effectiveness, where should serious attention be directed?

V. K. Kashin: The transition to the unified job authorization not only makes the stated factors more significant, but requires as well that new conditions be observed: interbrigade contacts and interrelations. If this condition is not met, then the brigades will have no effect on each other, there will be no spread collective (in the scientific meaning of the term "collective"),

there will be no increase in labor productivity, conflicts between the brigade and management shows up, and as a consequence the unified job authorization will be abandoned. Where and how can this condition be met if the brigades are working in different places along the right-of-way? Interbrigade interaction can be realized only when the entire spread resides in a single field settlement which has a well-developed cultural and domestic infrastructure. In a case like this, the settlement is not only a place for physical rest, but a place where the collective is formed, and this is a critical condition for increasing the effectiveness of the introduction of the unified job order into the spread.

ST: A number of the sector's problems connected with living and working conditions of the spreads' workers have been solved. It has been noted that the spreads having the best living conditions attain the highest results. This question needs to be discussed.

V. I. Satarov: From the very beginning of the experiment, we have paid serious attention to this factor. You can tell this if only by the way our living conditions have improved. This is the first time we have had such a large settlement built with all the conveniences.

Yu. S. Semenyuk: The organization of large-scale spreads has made it possible for us to solve a multitude of problems, especially social problems. There are about 500 persons in our settlement. We have central heating and running water here, there are facilities for our cultural leisure, and an administrative wing housing the domestic services and a movie hall.

Ya.-S. A. Myakush: There is no doubt that living conditions have improved. I have worked in this sector going on 25 years, and I recall a time when we lived in tents and railroad cars. Today we live in well-managed apartments. Each has a color television and carpets. The settlement is centrally heated. We have private baths, stores and a canteen. In a word, everything is there. We haven't had to change our residence in three years.

Yu. G. Ivanov: At present there are over 1,000 field towns in the sector, where up to 140,000 people live. The available housing space in the settlements along the right-of-way comes to 55,000 railcar residences and various blocs of mobile homes and domestic services. The overwhelming majority of the towns have everything necessary to provide the construction workers with normal leisure conditions. It has already been mentioned that wherever administrators have created good living conditions for the workers, that is where one finds high productivity indicators. Suffice it to use as examples the field towns Uzhovka, Krasnaya Mecha, Zubova Meadow and Shemordan, where the workers of our leading spreads have been given quarters. Everything possible has been done here to provide the construction workers with normal conditions for living and leisure: central heating and running water, an operating canteen, a store, a telegraph office and domestic services combine, there are libraries, Red Corners, the towns are equipped with radios, there are movie projectors and televisions, there are sporting units, and functioning artistic activity groups.

N. Ya. Rusanov: The ministry is putting a lot of emphasis on political-education and work on social amenities in the towns, and is realizing measures within the framework of joint programs with the USSR and RSFSR Ministries of Culture. Several groups of varying creative orientations have been organized. There are plans for an information system. In 1984 alone, over 1,000 social amenities measures were carried out on our primary rights-of-way. It is important that this system of cultural patronage be propagated in other construction sites as well.

A. D. Khaytun: I agree with the assertion that there is a close interrelation between the level of social welfare of those living on the right-of-way and the effectiveness of the spreads' work. Excellent living conditions have actually been organized in the field towns in the midst of constructing the gas pipeline. I would also like to add, considering the high relative share of the wages (up to 30 percent, we believe) that goes to make up for the complicated working conditions and the inadequately organized living conditions, that better living conditions seriously reduce the rate at which wages are increased.

The conditions and intensity of the work, the work schedule and the attunement of the workers to the vigorous activity involved in pipeline construction is considerably different from that which frequently goes on in other types of construction. This attitude toward work has been developed during all the years of pipeline work. In particular, the local inhabitants who come to work in our organizations quite often cannot tolerate this schedule, and when the spreads relocate, these people may "drop out". That is why we need further improvement in the living and working conditions on the right-of-way. Herein lies the stability of our work force resources for the future.

Yu. G. Ivanov: In 1983 the ministry adopted a document which regulates the sequence in which the field towns and shift settlements are planned, made up and built. This document effected an improvement of living conditions on the rights-of-way. So there was a 52 percent increase in the number of towns having central heating, and a 40 percent increase in those having running water, 70 percent of them were equipped with radios, in 86 percent of them it became possible to receive centrally-located television shows, and stationary movie projectors operate in 15 percent of them.

EKO: Are there any problems in organizing living conditions on the rights-of-way?

Yu. G. Ivanov: Yes, of course. First of all, not all of the mobile living facilities satisfy present-day requirements, and many of them are obsolete and do not have the required sets of furniture or auxiliary accommodations. We need to improve the production quality of our railcar-living quarters and VZhK [not further identified] blocks. The products list for the social infrastructure of mobile construction is quite small. There are practically no service line facilities. It is time to organize large-scale enterprises to produce residential railcars, mobile canteens, self-contained dormitories and other types of living quarters since, in connection with the increased volume of construction and installation operations which are being executed by the shift-expedition method, they all, to a great extent, increase the demand for mobile social facilities.

EKO: Have the specific features of mobile residence construction been coordinated with the workers' social prospects? What contradictions have arisen? What measures can be initiated to eliminate them?

A. P. Vesel'yev: I can confirm that in our line of work we still make few allowances for the specific nature of the mobile way of life, and we have not been persistent enough in providing our experienced workers with needed social conditions. As a result, our sector has witnessed serious distortions and disparities regarding social questions.

I. I. Mazur: If living conditions in the spreads are basically established, then the question of a permanent production and social center has not been conclusively dealt with. Where would a permanent place of residence, where would housing for spread workers, be? Besides, this question falls on the trusts, but the trusts do not concern themselves with these questions. There should be a clear-cut stance here, one which will determine the clarity of the social prospects of the spread workers.

I. G. Shaykhutdinov: Our people are quite interested in a center, and they want to know the prospects for their lives and if such is on the front burner for them. They want to know where and when they will obtain an apartment.

Yu. S. Semenyuk: Yes, we are summoned to some place, and that's all we have. The people who come to us to get a job are always interested in their futures. Fine, we'll finish our job here, then what's next? Where will we be living? For the work, the answer is simple: we're going to lay a line to Yamburg. But we need a center, and this would be located in the region where the trust is situated.

A. P. Vesel'yev: During the course of the experiment, the discrepancy of the productive experimental structure--of the spread to the long-term social interests of the right-of-way workers--became acutely evident.

What exactly is a spread? It is one thing when you have the customary administrative unit--the SMU [Construction-Installation Administration], the SU [Construction Administration] or the PMK [Mobile Mechanized Column], which is consolidated by legislative decrees, and another when you are dealing with a temporary goal-program structure, set up to solve a single problem. People do not want to go to work in a spread if they are going to have to wait in line somewhere for an apartment, or they know the prospects for their problems being taken care of.

The primary social ties of the worker with the trust, and with the city where he has always lived, are severed. The rupture, according to plan, is temporary, but the pipeline worker's vocation is permanent. This, if you wish, is the way of life.

Thousands of people in the field towns live with their families. Why is this? Why should a person have to migrate around with his wife and children? For a year or two, while a person is still young, it makes no difference where he goes, but we already have grandchildren showing up in the field towns.

All our formerly young workers, who previously took no thought of a permanent haven, are now left until middle age with, in fact, nothing. Letters come in from those who were formerly quite satisfied with their nomadic life (which also has its connoisseurs). They need to retire, but what is the housing situation? Here's one who is registered in Shchokino but works in the Urals. Or, in one place they've already allocated the apartment, but the local officials there decree that the person is not registered here, or is employed in a totally different region.

For answers to these questions, which are characteristic not only for our sector, we need legislative, juridically consolidated validated decrees which would provide people with solutions to the ordinary problems of life, so that they do not turn into serious social problems.

Today we have no lack of replacements for the work-force, and the prestige of our construction projects and our development of Western Siberia is very high, but we must look ahead. The enthusiasm of our young people, which has been engendered by the significance of this sector, and by the heightened effect of the work, subsides with age and grows quiet. Finding an apartment and a kindergarten are difficult tasks, and the health center is ill-equipped. This is where we have lagged behind the general construction ministries. A major effort is being carried out and a social development program is in effect, but all of this is being done for our youth sector, but we have not done enough for the developed areas.

We believe that the planning organizations and USSR Gosplan should give more complete consideration to the specific character of mobile construction and the conditions of the territory where we work and abandon the egalitarian distribution of capital investments among the sectors, and the non-productive sphere. We are prepared to bring in our own capital for social measures and residential construction, and the ministry's workers have the opportunity and have expressed the desire to invest capital in residential cooperatives. It is advisable to provide this money through the planning of material resources, and through the perfection of the appropriate legislative acts.

ER0: The accelerated introduction of scientific and technical achievements, the improvement of the economic mechanism and the organizational restructuring associated with that, and this includes the organization of spreads all call for a search for new forms of ideological work. What has the sector done in this direction?

N. Ya. Rusanov: Definite experience in ideological work was accumulated on oil and gas industry construction projects and in the collectives as far back as the 60's and 70's. However, the tasks set before the ministry during the 11th Five-Year Plan dictated the need for the work to be improved, for it to have great flexibility, and the main thing--to shift its "center of gravity" to the lower-level collectives--the administrations, spreads, sections and brigades.

At present, since the position in 1984, it can be said that much of what was conceived has found practical embodiment. Within the sector, a system of ideological and political-educational work has been organized which is organizationally linked with the large-scale measures which the party carried out in this direction. It encompasses all levels of production, from sectorial headquarters in the ministry down to the administration, the spread, and the integrated brigade. The functions of coordinators were laid on the ideological commissions and the commissions for youth work. Many examples could be cited of the creative goal-oriented work of these organs and their ideological aktiv. They place great emphasis on the development of the socialist competition and the dissemination of valuable initiatives.

It is no less important that the system which has become established has also caused changes in the psychology of supervisors of the most diverse ranks. Formerly, certain of them had thought it impossible to take active part in the ideological and political-educational work within the collectives. Today such a supervisor is the exception. The ideological work assumes the most diverse variety of forms. And it is in complete conformance to law that a collective, such as Glavtruboprovodstroy, for example, where the solution to production and social problems is interconnected with purposeful ideological work, achieves the best results.

This five-year plan period has witnessed the organization and vigorous activity of more than 100 party groups which are registered in the trusts' party committees or party raykoms, in the region where the efforts are being carried out. This is an important mobilizing measure. I will only say that at present we are already counting not individuals and not dozens, but hundreds of those people who were accepted into the party right on the rights-of-way.

#### THE PLACE OF THE EXPERIMENT IN THE OVERALL RESTRUCTURING OF CAPITAL CONSTRUCTION

EKO: How widely can the experience accumulated in the experiment be used?

A. P. Vessel'yev: The round table participants made a detailed analysis of the merits and complications of the experiment conducted among the spreads and acknowledged its high effectiveness. I share this point of view and believe that there is a need to work toward perfecting new forms of motivation and organization of labor in construction both in breadth and in depth, horizontally as well as vertically. Here, the enthusiasm of those who would circulate the conditions of the experiment to all the sector's construction projects will have to be cooled down somewhat.

The point is that even though the experiment was indeed conducted on a mass scale, and had a direct impact on the most critical national economic result, and even though the spreads worked on a right-of-way 4,500 km long, the "experiment's space" was relatively limited all the same, and does not encompass all the diversity of the working conditions of Minneftegazstroy's organizations, even that of the line construction.

Within the power-production corridor we were availed of the opportunity to concentrate our best forces on the five-year plan period and more, i.e. the opportunity to "stop and have a look around". This, speaking frankly, was done for the first time, and in principle such a concentration of line construction is uncharacteristic for the sector and it is doubtful whether it will be universal practice.

That is why, in order for this experience to be systematically disseminated, a number of organizational problems need to be developed and checked via experiment. When the former nomadic life begins because of the corridor being changed--previously we took one pipeline route across the Komi ASSR, then through the Urals, then through the Komi ASSR again--then an entirely different group of problems arises, which we as yet do not know how to approach, lest we gradually lose the valuable experience which we have gained in the course of this five-year plan period. In addition, there are regions like Kazakhstan and Astrakhan where such a volume of work is unexpected, and where it has been known beforehand that such a major effect could hardly turn out successfully. This is why we have to be realists and not overstate our evaluations or the results of the experiment, otherwise, if we begin to spread the achievements of the experimental spreads thoughtlessly, with no consideration for changes in the situation, then the effect can turn into something altogether different.

G. I. Shmal': Flow-type organization is needed not only on line construction, but in all the ministry's spheres of activity. At the present time, an experiment is being conducted concerning its use in industrial construction after the example of N. P. Nezhdanov's brigade, and in residential construction following the example of I. V. Smirnov's brigade.

When we talk about experimentation, we should give the ministry the right to experiment. It makes no sense to go to the government for permission every time. It takes a lot of time to comply with a variety of instances. The ministry possesses tremendous resources and laws regarding their expenditure, but they do not have at their disposal the right to select the most favorable direction for these resources in an experimental procedure. It would be within reason to give us this right.

I. I. Mazur: The experiment has been going on for over three years. But what kind of an experiment is it when the results of the work have already confirmed the correctness of the accepted solutions? We are aware of how the authorities have supported the dissemination of the brigade contract, but the local offices of USSR Stroybank [Bank for Financing Capital Investments] have suppressed it. It used to take a long time to convince people to transfer from a welding trust into a spread. There was a tremendous amount of misunderstanding, and we had to argue and convince people. But today there is no longer a need to give arguments. However, people quite fairly ask the question: why is it today, when we have already laid lines to Yamburg, and when the spreads have shown themselves in the best light, why is it that agreements concerning the unified job authorization cannot be concluded? A more clearly-defined and sound position is needed. The main administrations handle around a billion rubles worth of construction and installation work, and construct

several thousand km of pipeline every year, but the main administration doesn't have the right (nor does even the ministry) to give permission to organize a 220-man spread. The right to take care of matters, the benefit from which is obvious to everyone, without the slightest doubt, needs to be given. And this right should be given not only to the minister, but to the main administration as well, as it is an autonomous accounting administration.

Yu. R. Anpilogov: The procedure for economic experimentation has not been clearly determined by the statutes now in effect. Even though USSR Goskomtrud [State Committee for Labor and Social Problems] and the VTsSPS [All-Union Central Trade Union Council] confirmed the Provisional Procedure for Organizing and Conducting Economic Experiments in the Area of Labor in August 1984, this document comes up with nothing new, except systematization. The Provisional Procedure leaves to the ministries and organizations and to USSR Goskomtrud only those rights which they already now have. That is why this acute problem remains open. It seems high time to expand the rights of the ministries, and to give them the opportunity, considering the specific nature of the sector, to conduct experiments within the framework of the established wage fund, this being possible by approving specially allocated assets for these purposes. The more so, since the experiments are conducted, not to the detriment of the national economy, but will be used by all sectors to enter into the 12th Five-Year Plan period with an effective system of labor incentive.

B. I. Cherlakov: The experiment showed the rationality of using spreads, which rationality was reflected in accelerated pipeline construction. It is advisable to develop it even further. And it is important, from the position of Stroybank, that the work of the spreads be evaluated according to the results shown on signed documents regarding the laying of the pipelines. Even today, Stroybank has been giving 40 percent of its credit up to now to finance projects with unmet turnover deadlines, which amount comes to a total of from 1.1 to 1.2 billion rubles for large-diameter gas pipelines. There exist some flaws in small-diameter oil pipeline construction. Even though Minneftegazstroy operates quite well basically, widespread dissemination of the experience gained through the use of spreads is possible while eliminating the flaws.

A. P. Vesel'yev: In conclusion, I want to emphasize that the experiment with the spreads stirred up forces, the existence of which we previously had only guessed at. The workers assessed the potentialities of organization and wages in a new way, the administrators have seen the high success rate of the spreads and the ministry understands that the successful execution of the program to put main gas pipelines into operation was in large part made possible by the spreads. So the experiment needs to be developed, its content deepened, it ought to be disseminated to new construction projects and this should be done sensibly and soundly, without getting ahead of ourselves, but also without marching in place. Here, we need the help of the directive agencies, primarily USSR Gosplan, the help of USSR Stroybank and the understanding of the client ministries.

## IN PLACE OF A CONCLUSION

A. G. Aganbegyan: Calculations show that during the impending five-year plan period we will need to bring about a greater increase in the presently established growth rates for production efficiency. Normal methods produce no speed-up. For example, the large-scale experiment which has been going on in five sectors since the beginning of 1984, has not brought about the required speed-up.

Our experiment has produced definite positive results: it has improved the meeting of delivery schedules, has speeded up the labor productivity growth rates somewhat and has reduced production costs a little more. But this improvement was, for example, from 4 percent to 4.5-5 percent for labor productivity, i.e. not a radical improvement. Moreover, the preferential treatment which regard to supply, provision of transport, the credit made available to the enterprises, all of which helped in the carrying out of the experiment, should be taken into consideration. In my opinion, the reasons behind the fact that the progress made here was less than was expected, are the following: this experiment was inadequately presented to the workers and did not foster the interest in them that it should have, concerning the overall results of their labor.

In contrast to this, the method used in Shchokino as well as your experiment produced, if I may say it this way, an explosive effect, and led to a radical improvement in efficiency. So that this, in my view, is an outstanding achievement and is worthy of in-depth study and dissemination.

This improvement has demolished the established system, and makes altogether new demands on it. The collective contract is forcing a restructuring in planning, material supply, the organizational structure and social administration.

We need to evaluate what has been done with regard to its merits, and at the same time not whitewash those problems which remain unresolved, and we need to continue to improve this matter and keep it in the forefront of our thoughts. We need, first of all, to enhance the orientation of all concerned to the final objective, and to carry out "turn-key" construction. The objective is totally clear: a signed formal document, and quality. It is important as well to go farther: having the experience gained by the spreads in pipeline construction, it should be carried over to allied industries. We are going to have to disseminate cost accounting attitudes horizontally as well, having coordinated the different subdivisions, while at the same time disseminating these attitudes vertically, in the service of mutual relations. With time, it will be advisable to change the trusts over to the collective contract as well, and then, perhaps the main administrations, having more forcefully interested the workers of the administrative links in the final results.

Overall, the experiment has been a success. And now we should pose the question, not simply about experimenting, but making sure that it becomes the normal system of operation, for spreads at first, and then measures need to be thought out for the creation of conditions for other subdivisions.

If we look at the experience gained in the work done by the Minneftegazstroy subdivisions with a wide-angle lens, then we can see that certain fundamental positions of a rational system of economic management have been built into it which should be widely propagated within the other sectors of the national economy. It's a question of combining integration with specialization, of the purposefulness of the organizations regarding the achievement of the final results, of overall motivation in the utilization of the contract and the principle of incentives in the resultative (remaining) wage fund. It seems to me that all of this should find wide use in the experiments which are being conducted, and we need in particular to tighten up the conditions for the large-scale experiment with the collective contract. And then we will be able to bring about decisive improvements in our production efficiency, and accelerate the growth of labor productivity.

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OIL AND GAS

SECTORIAL PROGRESS, TASKS OUTLINED

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 3, Mar 85 p 1

[Editorial article: "Sectorial Tasks Discussed"]

[Text] A major role in the development of fuel energetics belongs to those who build oil and gas industry facilities.

Totals of the work done by Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises] organizations and enterprises in 1984 and their assignments regarding fulfillment of the state plan for economic and social development for 1985 in the light of the instructions and conclusions contained in the speech of CPSU Central Committee General Secretary K. U. Chernenko at the 15 November 1984 session of the CPSU Central Committee Politburo, and the decisions of the Second Session, Eleventh Convocation of the USSR Supreme Soviet which were taken up at the expanded meeting of the ministry board and the Central Committee Presidium of the Oil and Gas Workers' Trade Union.

V. G. Chirskov, minister of construction of petroleum and gas industry enterprises for the USSR gave a report. He analysed the results of the work done in the sector for the last years of the five-year plan period, including 1984, and examined the basic trends in realizing the 1985 construction program.

According to the ministry's figures, the volume of contract construction and installation work increased made a 47.3 percent increase over 1980. For four of the five-year plan period's years, R7.1 million more work was completed than for the corresponding period of the 10th Five-Year Plan period. Over 48,000 km of main pipelines were put into operation. This is almost as much as was put into operation during the entire 10th Five-Year Plan period. The ministry erected 225 compressor and pumping stations. Total housing space made available came to 7.16 million m<sup>2</sup>, as well as schools for 58,900 students, children's pre-school facilities for 39,000 children and a great number of cultural and domestic facilities. The primary result of the sector's activity is to be found in the marked improvement in production effectiveness and in the maintenance of high construction rates which were brought about by the intensity of our growth factors. The 1981-1984 plan for contract work was fulfilled in August 1984. Labor productivity reached the level set for the end of the five-year plan period. The profit goal was realized.

In 1984, for the first time in the sector's history, the total volume of completed contract construction and installation work reached R6.5 billion. This is 44 percent higher than the 1980 level. Major special-purpose problems were solved. The Urengoy-Center-1 pipeline, which is over 3,000 km long, was put into operation ahead of schedule, as was the Urengoy-Center-2 pipeline, which is 1,320 km long. A complex of facilities at the Karachaganak Field was put into operation a year ahead of the set deadline. The Zhanazhol'skiy Field has begun operation. Sectorial industry has kept pace with the plan with regard to all basic indices.

At the same time, it has come to our attention that individual main administrations, associations and trusts are acting slowly with regard to restructuring their activities in light of party and government requirements concerning economic growth and increasing the effectiveness of public production, improving their administration, strengthening state discipline and having a more business-like and responsible attitude. A number of oil pipelines, compressor and pumping stations and other facilities have not been put into operation.

Completing the sector's main task for 1985, which is to take part in realizing the program for augmented development of the country's fuel industry power production--requires the elimination of existing deficiencies and putting unused production resources into action. We need a continued acceleration in the implementation of scientific and technical achievements, advanced experience, improvement of the economic mechanism and the administration of construction, labor protection, reduction in expenditures of material and fuel-energy resources, improvement in the quality of the facilities now under construction and improvements in our work with the labor force.

Our primary resources must be concentrated on petroleum industry facilities: plans call for the construction of surface facilities in 15 new oil fields in 1985. A great deal of work must be completed in Yamburg and in Central Asia.

Main administration and association chiefs, as well as others who addressed the meeting examined the results of the work done by their collectives and went over the program for 1985, and discovered reserves for growth in labor productivity, the utilization of which will promote the successful realization of the assignments for the final year of the 11th Five-Year Plan period.

Deputy Chairman of the USSR Council of Ministers B. Ye. Shcherbina examined methods by which the complex and critically important tasks facing the sector can be dealt with, in his address.

The Minneftegazstroy board and the Presidium of the Trade Union Central Committee adopted a decree directed at completing the work program for 1985. The socialist obligations of the ministry's labor collectives were approved.

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OIL AND GAS

1985 OIL, GAS INDUSTRY SOCIALIST OBLIGATIONS OUTLINED

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 3, Mar 85 p 2

[Article describing industry socialist obligations: "Socialist Obligations of Ministry of Construction of Petroleum and Gas Industry Enterprises Organization and Enterprise Collectives for 1985"]

[Text] The labor collectives of ministry organizations and enterprises are responding to the decisions of the 26th Party Congress and successive CPSU Central Committee Plenums with concrete actions, in that they are dealing with the tasks set before them concerning increasing oil and gas industry capacities, and are vigorously fulfilling their obligations to put the main pipelines from Urengoy to the center and to the western part of the country into operation two to three months ahead of the set deadlines.

As a token of their warm approval and support of the domestic and foreign policy of the Communist Party of the Soviet Union, and guided by the statutes and conclusions laid down in the program-oriented speeches of CPSU Central Committee General Secretary and Chairman of the USSR Presidium of the Supreme Soviet Comrade K. U. Chernenko, the workers of this sector's organizations and enterprises accept the following socialist obligations:

To complete the five-year plan assignment for erecting the system of main gas pipelines from Western Siberia, which lines have an annual capacity of tens of billions of cubic meters of gas, ahead of schedule.

To complete the fulfillment of the five-year plan program of contract construction and installation work by the 40th anniversary of the Soviet people's Victory in the Great Patriotic War.

To put the Urengoy-Tsentr-II main gas pipeline into operation ahead of scheduled deadlines. To put the following compressor stations on this pipeline into operation: the Priozernaya--in March, and the Khasyreyskaya, the Pravokhettinskaya, the Komsomolskaya, the Yagel'naya and the Lyalinskaya--in May.

To insure that the Yamburg-Yelets gas pipeline is put into operation ahead of schedule, to construct 2,000 km and put no less than 1,000 km of pipeline into operation.

To complete the planned program of work on constructing field facilities for the Astrakhan and Yamburg fields. To have the Astrakhan-Kamysh-Burun gas pipeline into operation a full quarter ahead of the prescribed deadline.

To complete work on the construction of field facilities for 15 new oil fields in Western Siberia, and to turn over to the purchasers oil preparation installations having an annual capacity of 23.5 million tons, pressure-normalizing pumping stations having an output of 355,000 m<sup>3</sup> per day, and over 3,000 km of oil field pipelines.

In honor of the anniversary of the Victory, to complete work on the linear section of the Kholmogory-Klin oil pipeline. To put the Saratov-Kuzmichi oil pipeline into operation ahead of schedule, i.e., by the 50th anniversary of the founding of the Stakhanovite movement.

To complete the five-year plan program of oil products pipeline construction ahead of schedule, and to put the Lisichansk-Voroshilovgrad oil products pipeline on stream six months ahead of the established deadline.

To have a total area of housing of 2.16 million m<sup>2</sup> ready for occupation, including 230,000 m<sup>2</sup> in addition to the plan, and 13,300 desk spaces of children's pre-school facilities and 797 beds' worth of hospital space available. For the purpose of realizing the Basic Directions in reforming general educational and professional schools, to construct, by the beginning of the academic year, 6,500 places of above-plan general education schools.

To develop an effort for the zealous utilization of materials and fuel and to insure the fulfillment of prescribed assignments for saving 23.5 million KW-hours of electric power, 34,300 tons of ferrous rolled metal stock, 146,800 tons of cement, 142,500 m<sup>3</sup> of lumber, 8,700 tons of gasoline and 6,200 tons of diesel fuel. To work off two days through above-plan savings in resources. To effect a 6.5 million ruble saving by reducing the prime cost of construction and installation work and to insure completion of assignments to reduce production costs set during the 11th Five-Year Plan period.

To continue the effort to solve the central problems of scientific and technical progress, of the continued technical re-equipping of the sector, of improving the organization and production procedures of the construction industry, of the elimination of seasonal fluctuation in the completion of work, and to continue our efforts on developing and introducing power- and labor-saving production methods and on improving the economic mechanism.

To raise the volume of construction and installation work done by the brigade contract method to 55 percent, and work done by the integral process contract to 20 percent.

To conclude trials of the experimental model of the 81.4 KW capacity I-524 wheel excavator, used for digging full-contour trenches in permafrost.

To complete the electric resistance welding and automatic wire welding of 3,200 km of main pipelines and field pipelines in 1985. To develop, in collaboration with the Institute of Electric Welding imeni Ye. O. Paton, electric resistance welding equipment for 377-530 mm diameter pipe.

To introduce a new method of ballasting pipelines by using nonwoven synthetic materials. To complete the program of constructing the linear section of the Belovo-Novosibirsk pilot pipeline to be used for hydrotransporting coal.

To carry out, for the purpose of further developing the self-contained block unit method of construction, standardization of volumetric layout and design resolutions, and to reduce the list of products produced by plants for self-contained block unit construction by 20 percent. To increase the volume of oil and gas industry facilities constructed by the self-contained block unit method to R1.2 billion. To devise a prototype 1000-ton superblock for field structures in the Yamburg gas-condensate field, and to carry out its transport and installations tests. To obtain an economic effect of R390 million by carrying out measures to introduce new equipment and advanced production methods and by improving labor productivity, and to save no less than R51.5 million by using inventions and rationalization proposals.

To bring the highly-mechanized production lines, used for manufacturing tee-shaped piping connections at the Novosineglazovskiy Construction Designs Combine up to design capacity ahead of schedule, and to deliver them in volumes of no less than 2,300 tons. To equip seven manipulators to the manufacture of pipe connections and fittings, and to introduce 70 units of plasma metal-cutting equipment.

To initiate production, beginning in the second half of 1985, of production of self-contained structures of increased factory readiness at the Serpukhov Structural Designs Combine. To deliver plans for 20 athletics complexes to the sectorial construction organizations. To initiate production of a new series of concrete box units at the Vinzilin House-Building Combine, for the complete set delivery of shift settlements.

To change over, starting in 1985, to the construction of a new series of shift settlements, this work to be handled by the Blokzhilkomplekt [possibly Unitized Housing Set Delivery] Association, which has guaranteed production of 92 residential complexes, 30 canteens of 60 seats each, and 24 "Red Corner" propaganda facilities. To produce a prototype of a prefabricated health culture and athletic complex for the construction workers who are working on setting up the field facilities for the Yamburg gas-condensate field. To insure a 15 percent reduction in metal for every square meter of usable area in the shift complex.

To organize production of experimental self-contained residential settlements for 200, 300 and 400 workers each for the Yamburg Field. To initiate production and to manufacture 30 self-contained mobile brigade-sized warm-up structures for the construction workers in the northern regions of the Tyumen Oblast, as well as 150 sauna baths, and 50 mobile health stations.

For the purpose of industrializing construction, and reducing the time needed to put compressor stations on stream, to manufacture 25 sets of pipe assemblies at the Novosineglazovskiy Building Structure Combine.

To initiate production of new types of living and social welfare panel and large-block structures to be used in the build-up of the northern regions of the Tyumen Oblast and the Komi ASSR, at the Surgut, Uray and Ukhta house-building combines.

To insure that the capacities for production of 250 shift buses are put into operation ahead of schedule at the Volokolamsk Building Structure Plant, and 10,000 tons of metal structures at the Sibkomplektmontazh [Siberian Association for the Installation of Equipment in Complete Sets] building structure enterprise.

For the purpose of improving the social welfare conditions of the sector's workers and their families, to construct and put into operation 670,000 m<sup>2</sup> of living space, 3,110 places' worth of children's pre-school facilities, a 210-bed health-care and preventive clinic, a 400-place Pioneer camp and a 400-person rotating shift polyclinic.

To produce, in the sector's agricultural enterprises, 2,600 t of butter and 3,100 t of milk. To increase and bring production of cultural and personal goods and goods related to this economy up to R5 million. To sell an additional R3 million worth of workers' supplies.

To aim for the execution of an integrated plan for improving the conditions, labor safety procedures and sanitation and health measures of no less than R75 million. To bring about improvements in the prevention of production-related injuries, to practice the carrying out of equipment safety days and schools to teach advanced labor methods, using organizations and enterprises having a high level of labor safety procedures, on a regular basis. To train and raise the skill-levels of 8,300 engineering and technical personnel and specialists and 100,000 workers. We will appeal to oil and gas industry labor collectives, machinery builders and transport workers to expand the development of competition based on the principle of the "workers' relay race" for developing and putting oil and gas industry capacities into operation ahead of schedule and for execution of the USSR Power Production Program.

We assure the Leninist CPSU Central Committee and the Soviet Government that we will do all in our power and apply all our energy and creative initiative toward the fulfillment of our assignments for 1985, and toward the successful completion of the assignments of the 11th Five-Year Plan, and that we will greet the 27th CPSU Congress with shock labor.

These socialist obligations were developed on the basis of the obligations of the sector's labor collectives and have been approved at an expanded session of the Minneftegazstroy board and the Presidium of the Central Committee of the Oil and Gas Industry Workers' Trade Union.

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OIL AND GAS

**VERY-DEEP EXPLORATORY DRILLING TO BEGIN IN TURKMENISTAN**

Ashkhabad TURKMENSKAYA ISKRA in Russian 16 May 85 p 2

[TurkmenINFORM article: "Toward Deep Horizons"]

[Text] The collective of Turkmenneft' Production Association has entered a new stage in natural-resource exploration. Installation of a BU-6500 drilling rig has begun south of Nebit-Dag. The rig will drill a 6-km deep exploratory well.

The chief of the Exploration Planning Laboratory for New Areas of TurkmenNIPIneft' [Turkmen State Scientific-Research and Project Institute of the Petroleum Industry], O. Topayev, comments on this event:

"Oil and gas exploration and production have been carried out at medium depths: 3000-4000 meters," he says. "But most of the reservoirs and fields found have had small reserves or are at the final stages of production. In order to maintain production, the fuel has to be 'forced' to the surface, which requires large expenditures."

Therefore, the geologists have to base the republic's oil industry on exploration at depths greater than 5 km. The association has had no equipment capable of reliable operation at such depths.

Drilling of the first very-deep well will begin late this year. By that time, the collective of Turkmenneft' Association should receive another very-deep-drilling rig. Super-deep wells are planned at Kum-Dag, Bugdayly, Kara-Tepa and Monzhukly during the 12th Five-Year Plan.

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OIL AND GAS

MACHINEBUILDERS PLAN HIGHER OUTPUT, BETTER QUALITY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 10 Apr 85 p 2

[Article in column "The Newspaper Reported. What Was Done:" "Equipment for the Oil Workers"]

[Text] A report, published on 7 July of last year in SOTSIALISTICHESKAYA INDUSTRIYA under the title "Equipment for the Oil Workers," described the business meeting in Baku between the Tyumen and Azerbaijan oil workers and the machine builders of Soyuzneftemash VPO [All-Union Production Association]. The meeting was organized by the editors, in conjunction with the Central Committee of the Azerbaijan Communist Party. The meeting participants noted the unsatisfactory technical level of production at Baku petroleum machine building plants. They noted that plant reconstruction is going slowly and there are distortions in equipment modernization. These factors have a negative effect on the production volume and the quality of oil-industry equipment.

Deputy Minister M. Troitskiy of the Ministry of Chemical and Petroleum Machine Building [Minkhimash] reported that the ministry has taken the necessary measures concerning the critical comments made by the meeting participants. In particular, the equipment structure at Baku plants has been improved. Last year, these plants received 335 metal-cutting machine tools, including 20 numerically controlled machine tools and 39 special machine tools. They also received 74 units of forge-press equipment and 45 new lift trucks, including electric ones. The association received 14 new bridge cranes to replace outmoded ones, and 31 more cranes will be received this year.

Unfortunately, the editors' reply notes that the capital-investment limits and the construction-installation-work limits of Soyuzneftemash VPO are only about three-fourths implemented. The basic reason for this is shortfalls in the work of contractor organizations from the AzSSR Ministry of Industrial Construction.

In January of this year, the Minkhimash collegium, along with the managements of VPO Soyuzneftemash enterprises, discussed the measures taken to ensure fulfillment of the production plan for oil industry equipment and to improve equipment quality. The association is to spend 213.5 million R

on capital investments in the coming years to develop the Baku plants--twice as much as will be used in the current 5-year plan. Of this total, 75.1 million R is to be directed toward construction-installation work--1.8 times more than the expected implementation for the present 5-year plan. The plan calls for spending 90 million R to re-equip existing enterprises; this is 42 percent of the total volume of capital investments.

At the business meeting in Baku, the positive experience of the partial participation of the Ministry of the Petroleum Industry in reconstructing a number of petroleum machine building plants, including plants in Baku, was noted. Such participation by the petroleum industry is possible in the future, especially in developing productive capacity for progressive equipment.

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OIL AND GAS

FIND NEW OIL IN OLD PRODUCING AREAS

Baku VYSHKA in Russian 7 Jun 85 p 1

[Article by S. Garayev: "From an Old Producing Area"]

[Text] Neftechala--The Neftechala Oil and Gas Field has been worked for over a half century. However, the old area has brought some surprises in the form of new discoveries for the exploration workers. Recently, a new well drilled by the brigade of forman Arif Salimov produced a gusher at a depth of 1700 meters. Thanks to the efforts of drillers Amirasian Nuriyev and Nadir Azizov and helpers Aligeydar Muradov and Zul'figar Gamzayev, the well was completed and turned over to the Neftechalaneft' Oil-and-Gas Production Administration a month ahead of schedule. The well has justified the geologists' hopes about the oil content of the productive formation's eighth horizon. The free-flowing well produces a maintainable 15-20 tons of oil per day.

New production well No 1068 is a free-flowing gas well. At present, the drillers of the Prikurinskiy Drilling Administration are constructing another production well, No 1095.

An intensive search for oil is presently underway in the old area of Khilly. Well No 417, which was given over to the production organization last month, is operating steadily and produces about 20 tons of oil per day. Today, the brigades of drilling foremen Seidgasan Kyazinov and Arif Salimov are drilling at a very fast rate in the old area. The former collective is drilling well No 416, while the latter is drilling well No 449. Both wells are inclined-directional wells. The drillers, having begun their labor watch in honor of the 27th CPSU Congress and the 31st Congress of the Azerbaijan Communist Party, have decided to turn over both wells to the production organizations ahead of schedule.

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OIL AND GAS

BRIEFS

ACCELERATED OFFSHORE DRILLING--A free flow of over 300 tons per day of oil was obtained, from a depth of 3255-3332 meters, out of well No 109 in the Imeni 28 Aprel' Field. This expands the boundaries of oil and gas occurrence in the 10th horizon of the Balakhany Suite and the separating suite. It will provide additional oil production for the Imeni 22 S"yezd KPSS Association. The brigade of drilling foreman Mamedagi Aliyev put the well into production 2 months ahead of schedule. Well No 110, which is also expected to be a big producer, is being completed from the same No 2 Platform. The entire collective of the Bukhta Il'icha MURB [Offshore Exploratory Drilling Administration] is preparing to celebrate the 27th Congress of our party with good labor achievements. The MURB has completed over 5000 meters of above-plan drilling since the beginning of the 5-year plan. [By R. Kender] [Excerpts] [Baku VYSHKA in Russian 31 May 85 p 1] 12595

NEW OFFSHORE WELLS--Exploratory well No 20 in the Imeni 28 Aprel' Field has begun free-flow production of about 300 tons of oil per day from the separating suite at a depth of 2950 meters. This confirms the geologists' predictions on the productiveness of the field, which is in test-commercial production. This well, drilled 2 months ahead of schedule, is the first of 24 wells to be drilled from the No 3 Platform, located in water 115 meters deep. The brigade of drilling foremen G. Nazarov and S. Imanov from Bukhta Il'icha MURB [Offshore Exploratory Drilling Administration] has drilled 650 meters per rig per month, compared to a plan of 330 meters. Soon, the brigade of foremen N. Dzhafarov and M. Bakhshaliyev will put into production, ahead of schedule, production well No 120 from the same platform. This well was drilled down the dip of the reservoir to determine its boundaries. Preliminary data indicate that a large oil flow is to be expected. Chief engineer of Bukhta Il'icha MURB Sh. Bakirov said: "The production of oil from these new wells is a big event in the lives of the oil exploration personnel. This is the gift from the drillers to the 40th Anniversary of the Great Victory. The MURB collective is obligated to put two more wells into production in the Imeni 28 Aprel' Field by 9 May." [Text] [Baku VYSHKA in Russian 3 Apr 85 p 1] 12595

KYURSANGYA DRILLERS FULFILL PLAN--Ali-Bayramly--The drilling brigade of foreman Sarkhosh Mamedov, an Order of Lenin recipient, from the Kyursangya Drilling Administration has fulfilled its 5-year plan task for completing

new oil wells. In 4 years and 4 months, the workers of the Sal'yanneft' Oil and Gas Production Administration have taken over 8 oil and gas wells, all of which reached oil-bearing horizons in the Kyursyangya Area. One other milestone was recently passed by the leading collective. The drillers fulfilled their half-year drilling plan ahead of schedule. This was their gift in honor of the 40th Anniversary of the Great Victory. Since the beginning of this year, about 2300 meters of steel casing have been installed in the promising field in the Prikurinskaya Lowland. All of the drilling for the new No 177 well will go toward the 12th Five-Year Plan. [By S. Garayev] [Excerpt] [Baku VYSHKA in Russian 23 May 85 p 1]

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NEW TYUMEN OIL PRODUCTION--Tyumen, 21 [Apr]--A large oil flow from the new East Surgut Field has been sent through main pipelines to the country's refining centers. This new hydrocarbon source was put into production ahead of schedule. In the northern Tyumen region, the West Solkinskoye, Pogranichnoye, and other fields have recently been put into production. But this is only the beginning. During the last year of the 5-year plan, the Siberian construction workers are to put tens of new fields into service for the national economy. In order to permit the Tyumen oil to flow freely, construction of the Kholmogory-Klin Main Pipeline is being completed. [By V. Lisin, PRAVDA correspondent] [Text] [Moscow PRAVDA in Russian 22 Apr 85, p 2] 12595

FIRST POGRANICHNOYE PRODUCTION WELL--Noyabr'sk, Yamalo-Nenetsk Autonomous Okrug--The first production well has been drilled in the new Pogranichnoye Oil Field. The well is nearly 3000 meters deep. The field had already been producing oil, but only from an exploratory well. Commercial production has now begun. This year, 120,000 meters of drilling will be carried out here. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 5 Jun 85 p 1]

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HIGHER OFFSHORE PRODUCTION--The offshore oil workers from the fourth shop of the Artemneftegas Oil and Gas Production Administration are doing an excellent job in carrying out their labor watch in honor of the 40th Anniversary of the Great Victory. Since the beginning of the year, the collective has above-plan production of 380 tons of oil and 50,000 cubic meters of gas to its credit. The brigades headed by foremen Ziyaddin Tomarov, Shirbala Kerimov and Ruslan Kurbanov are among the leaders in the socialist competition; these brigades have been tirelessly searching for reserves to increase the production of these valuable raw materials at the Banka Apsherona Field. The leaders' successes have been achieved largely through the fulfillment of tens of units of above-plan geological-technical work each month. Recently, the production-site workers, after geophysical research on the formations, worked over two wells which are now producing several additional tons of oil per day. By 9 May, the shop collective is obligated to bring its above-plan oil production to 500 tons. [Text] [Baku VYSHKA in Russian 5 Apr 85 p 1] 12595

NEW UKRAINIAN FIELD--Chernovtsy--Geologists of the Kalush Oil and Gas Deep-Drilling Expedition of the Ukrzapadgeologiya Geological Production

Association have found a promising new oil field, the Lopushnyanskaya No. 3, in the oblast. The drilling brigade headed by O. Ivantsiv had to drill through a complex geological sequence. Unstable saline clays at a depth of 3700-4000 meters delayed the work. The difficulties were overcome through the tireless efforts of the engineering-technical personnel and by using the proper technological methods. [By I. Germakovskiy] [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 19 Mar 85 p 1] 12595

**GAS PRODUCTION OBLIGATIONS FULFILLED--Orenburg**--The socialist obligations of the Orenburggazprom All-Union Production Association for the final year of the 5-year plan were fulfilled ahead of schedule. The association now has over 350 million cubic meters of gas above plan to its credit. Total above-plan production for the 5-year plan exceeded 4 billion cubic meters. The Orenburg Gas Complex makes very efficient use of this raw material by producing gas condensate, sulfur, ethane and helium. The gas workers achieved their new success by implementing ahead of schedule the new Karachaganakskoye Gas-Condensate Field in northern Kazakhstan and by making skillful use of their equipment. The technological services functioned efficiently and in an organized manner under last winter's harsh conditions. The association's collective has accepted increased socialist obligations. An additional 600 million cubic meters of this valuable chemical raw material and fuel will be produced above the plan by the end of the year. They have also decided to reach the 500-billion-cubic-meter level of production from local fields by the opening of the 27th CPSU Congress. [By Ye. Kmelevskiy] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 May 85 p 1] 12595

**YAKUT GAS FILLING STATION--Neryungri**--A natural gas filling station has been approved for service in the South Yakut Coal Complex. The start-up of this station has greatly expanded the delivery range for the "blue fuel:" it will now be available in many settlements in the autonomous republic's agricultural regions and will be available to reindeer herders in remote pastures. The Neryungri Coking Coal Enrichment Plant and a number of other important industrial facilities in the region will also receive the "blue fuel." The new station will provide great economic savings, since filled gas tanks were previously brought into Yakut ASSR from Khakass Autonomous Oblast. The gas will now be delivered in special tank trucks, which will halve the transportation expenditures. [By L. Rybakovskii] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 2 Apr 85 p 2] 12595

**TURKMEN WATER PIPELINE--Nebit-Dag, Krasnovodsk Oblast, 3** [Jun] (TASS)--The first section of the multi-km water pipeline from Nebit-Dag to the oil-workers' settlement of Vyshka has been laid through the sand dunes. The pipeline construction pace was speeded up through close cooperation between the different participants and by implementing cost-accounting mechanized links. The pipeline, which will double the settlement's water supply, is to be put into service this year. [Text] [Baku VYSHKA in Russian 4 Jun 85 p 1] 12595

**GAS PRODUCTION FROM SARSENBAK--Mangyshlak Village, Kazakh SSR**--A free-flowing well in the Sarsenbay Area is exceeding by 3-5 times the

average daily production of the richest gas sources in the Mangyshlak fields. The success was achieved by the drilling pioneers from the Mangyshlak Exploratory Drilling Administration. Specialists believe that the rich Sarsenbay will become a large raw-material supplier in the near future for the Kazakh Gas Refinery and the Shevchenko Plastics Plant. The nearby presence of underground pipelines from other main gas pipelines will hasten the task of putting the area into production. [By A. Seroshtanov] [Text] [Moscow PRAVDA 25 May 85 p 1] 12595

TURKMEN GAS DISCOVERY--Balkui, Turkmen SSR, 1 [Apr]--A happy event occurred for the exploration workers of the Achakskoye Drilling Administration of Turkmensevburgaz Production Association: they made a new gas discovery in the desert. This success was achieved by the brigades of drilling foremen R. Urazmetov and F. Mannayev. The gas flow came from a depth of 3000 meters. [By A. Grachev, PRAVDA correspondent] [Text] [Moscow PRAVDA in Russian 2 Apr 85 p 2] 12595

SOVETABAD GAS CONDENSATE PRODUCTION--The first phase of initial facilities of the Sovetabad Gas-Condensate Field has been brought up to design capacity. The second preliminary gas-preparation unit will be put into operation by the end of March. The production workers of Shatlykgazdobycha Production Association imeni 60-letiye SSSR, together with construction and installation workers from the Shatlykgazstroy Trust, will perform the startup and adjustment work and the equipment inspection. "Our collective's socialist obligations for this 5-year plan," said the association's general director, V. S. Nazemkin, "called for 1 billion, 200 thousand cubic meters of 'blue fuel' production above the plan. By March, however, the above-plan production totalled over 2 billion cubic meters of gas. When the second phase of Sovetabad's initial facilities is put into production in the first half of the year, the quantity of above-plan production will greatly increase." [By P. Kul'kov] [Text] [Ashkhabad TURKMENSKAYA ISKRA in Russian 19 May 85 p 2] 12595

NEW AZERBAIJAN DRILLING AREA--(Azerinform)--The Gobustanskoye Drilling Administration has relocated nearly 400 km to the east in the republic, from the Apsheron Peninsula to the interfluve of the Kura and Iori Rivers. The new Dzheyranche'l'skoye Exploratory Drilling Administration has been established on the base of this enterprise in the Shamkhorskiy Rayon. The administration's collective will explore the promising oil and gas areas discovered by Azerbaijan geologists in the region and prepare them for commercial development. [Text] [Baku VYSHKA in Russian 10 Apr 85 p 1] 12595

CSO: 1822/250

COAL

## ELIMINATING LOSS OF COAL IN TRANSIT

Moscow MATERIAL' NO-TEKHNICHESKOYE SNABZHENIYE in Russian No 2, Feb 85 pp 58-59

[Article by E. Shledevits, NIIZhT [Scientific Research Institute of Railroad Transport] laboratory director, N. Fedenev, engineer and F. Zelenkov, NIIMS [Scientific Research Institute for Economy and Material and Technical and Technical Supply] department head: "Coal Without Losses:Correspondence to Us"]

[Text] Every year, over two billion t of bulk freight are shipped via railroad transport from their recovery and production centers to consumer areas. There are millions of t of coal, iron-ore concentrates, enriched non-ferrous metal ores, coke, peat, chemical and mineral fertilizers and construction materials.

In the process of being transported there are losses of freight, including losses of coal which by far exceed those allowable according to the norms for natural losses. According to an evaluation made as long as 10 years ago, up to 10 million t of coal have been lost while being shipped by railroad transport, and this quantity is double that at present, coming to about three percent of the annual amount of coal mined.

In addition to the harm done to the national economy by the losses of this valuable freight, additional difficulties arise. Railroad operations have been complicated and expenditures for the repair of railroad lines and for the reconstruction of automatic blocking track returns.

The increase in coal losses is explained in large part by the increased speeds of the trains and the alteration of the granulometric makeup of the bulk loads. For example, the volume of fractions of up to 13 mm comprises about 50 percent of the volume of the coal shipped. However, the main reason is the absence of the needed preparation of the rolling stock and the freight for secure shipment.

NIIZhT [Novosibirsk Institute for Railroad Transport Engineers] conducted theoretical and experimental research in laboratory and operational conditions aimed at enhancing the safety of the shipments and the selection of equipment for preventing losses during railroad shipments. Using the data which were obtained as a basis, recommendations were worked out which encompassed the entire complex of measures which the railroads, the coal enterprises, the

the metallurgical and chemical industry and the railroad car-building plants have to take. A portion of these measures are organizational in character, and for which greater outlays are not required, and others require capital investments and need time in which to be realized. But all of them guarantee the safety of the shipments in transit, and make it possible for millions of tons of coal, ore and other valuable materials to be put in to circulation in the national economy.

The carrying out of the developments proposed by the institute need to be provided with economic, organizational and legal guarantees. In particular the legal basis should be adequate for the potentialities of the production association and enterprises, and for their economical motivation in the results of having implemented scientific research.

At the present time, there are a number of measures designed to insure the safety of transportable loads, which measures are at the stage of being put into practice. Thus, in compliance with a MPS [Ministry of Railways] order, old-style gondola cars are being modernized. The Novosibirsk Institute of Railroad Transport Engineers and the All-Union Scientific Research Institute of Railroad Car Construction have developed labyrinth packing for the chutes and facing doors, which packing is being used in the construction of new gondola cars. The main freight administration of the ministry and the NIZhT have prepared regulations and specifications for the shipment of fine-fraction bulk freight in open rolling stock. This document specifies the requirements for preparing freight for shipment, the execution of which will reduce or completely prevent losses.

In order to insure the safety of the coal the shipping enterprises should use roller-compactors or vibro-rollers as well as installations for applying a protective coating onto the surface of the load. They should also deck the floors of the gondola cars. USSR Minugleprom [Ministry of the Coal Industry] has to date manufactured 200 of the roller-compactors recommended by NIZhT, although no less than 400 of them are needed, i.e. one for each enterprise shipping fine-fraction coal. The use of these rollers reduces losses resulting from blow-off by 30-40 percent. But, as has been shown by experience, they work on an irregular basis. Their use is not monitored as required.

There is still a shortage of the installations used to apply protective films, although they have been developed and have undergone production trials at the Abashevskiy Central Enrichment Mill, and the Karaganda, Vorgashor and Voroshilovgrad enrichment mills, as well as at the Olenegorsk Mining-Enrichment Combine imeni 50-letiya USSR. Calculations show that use of these installations produces an economic effect of about R300,000 per million tons of transported freight.

The inadequate rates at which these installations have been constructed are, in our view, explained for the most part by a lack of motivation on the part of the consigning enterprises. What is the matter here? In the first place, certain capital investments are needed, which have not been allocated for this purpose. Second, GOST [All-Union State Standard] 117-62-66 and the Regu-

lations on hauling freight on railroads permit a large amount of error with regard to weighing and the criteria for agreement of the mass of freight received with that of freight shipped. That is why the losses are so easily written off.

The weighing error, in compliance with the above-indicated standard, comes to ±1.75 percent. The regulations on shipping freight specify that the mass of the freight is considered to be correct if the difference in the amount stated on the weight declaration, which was determined at the station of origin, when compared to that shown for the station of destination, does not exceed the standard amount allowed for natural losses and accuracy for the weight of the load. Consequently, losses from the coal mass of over a ton and a half per gondola car have been detected upon receipt and are considered approved.

The legal interrelation of the freight consigners and the consignees places the latter in a dependent economic position. For example, when shipping coal from Vorkuta to Cherepovets, the tariff for shipping a gondola car of coal comes to R380. Losses amount to 1-1.5 t, and come to an entire gondola car of coal for the whole route. It is up to the consignee to make good the deficiency. The freight consigner in this connection incurs no material expenses for the compensation of losses due to a natural store. Thus while maintaining transport, the consignee will pay less for freight than for the very same mass shipped without the use of the installations for loss prevention.

In our opinion, it would be advisable for USSR Minugleprom to provide for the allocation of additional funds to be used to construct points at which freight could be prepared for safe transit, and for USSR Goskomtsen [State Committee on Prices] to correct freight prices taking into account expenditures for constructing and operating the loss-preventing installations.

It might be well to point out that the capital investments used to insure the safety of the freight are several times more effective than those monies invested in the extraction or production of additional quantities of material resources. This is the position with regard to (hard) coal. Here, obviously, capital investments allocated to increase coal recovery are better realized by USSR Minugleprom. However, from the national economic point of view, such an allocation cannot be considered the most favorable. Simultaneous with an increase in coal recovery, the volumes in which it is shipped also increase, and losses increase in proportion to this as well. As a result, when increasing the mass of recovered coal, the national economy receives less of it due to in-transit losses.

In this connection, this question is germane: do all the capital outlays need to be invested in constructing new mines and modernizing those already in operation, or should part of these funds, and here substantially less of them, be directed toward preventing these increasing losses? The most favorable method of allocating funds aimed at increasing coal recovery and reducing losses will permit the obtaining of millions of additional tons of coal, which are being irretrievably lost at the present day.

Coincident with this, the accuracy of weighing the coal and ore concentrate on railroad car scales should be made more accurate with official standardizing acts. The standards for natural losses should be stricter, and consideration should be made of the actual distances bulk freight is shipped.

This effort should be carried out by USSR Minugleprom in conjunction with the Ministry of Railways and USSR Gosstandart [State Committee for Standards]. The results of this effort will produce a substantial national economic effect.

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COAL

### NERYUNGRINSKIY OPEN-PIT INCREASES OUTPUT

Moscow UGOL in Russian No 6, Jun 85 pp 20-21

[Article by V. V. Novikov, candidate of technical sciences, S. M. Tkach, engineer, of the IGD Severa YaF SO AN SSSR [Northern Institute of Mining Affairs imeni A. A. Skochinskiy, Yakutsk Branch, Siberian Division, USSR Academy of Sciences] and A. A. Deryabin, of the Yakutsk CPSU Obkom, under the rubric "Open-Pit Mining Operations": "Intensified Coal Mining at the Neryungrinskiy Open-Pit Mine"]

[Text] The primary increase in the volume of coal mined in the Yakut ASSR in the years ahead should come about as a result of the Yakutugol' Association's Neryungrinskiy Open-Pit Mine having been brought up to full operational capacity.

Prior to the time when this open-pit mine entered service, plans had called for mining operations to be carried out in three sectors--the Southwestern, the Western and the Northwestern, which were divided among themselves by provisional boundaries. The average length of the mining operations front was 3.6 km.

With the existing length of the mining operations front and the angle of slope of the working flank ( $9\text{--}14^\circ$ ), in order to mine 1.5 million tons of coal, no less than 130 million  $\text{m}^3$  of the pit will have to be stripped, and to mine 7 million tons, over 240 million  $\text{m}^3$  will have to be removed (Fig 1).

One of the primary directions for intensifying open-pit coal mining is the temporary suspension of mining at the Southwestern section and an increase in the volume of development work at the two other sections. The Southwestern section of the field is characterized by extremely unfavorable mining engineering operating conditions: the increased thickness of the overburden, the fact that the coal seam is thinner, and its increased angle of dip. The median operational coefficient of the overburden is 3 times higher than the similar indicator for the entire field.

A temporary negligible reduction in the length of the strip mine's working front will have no substantial effect on the level of productivity of the mining transport equipment, by virtue of the section on the eastern limb of the field's having been brought into the development.

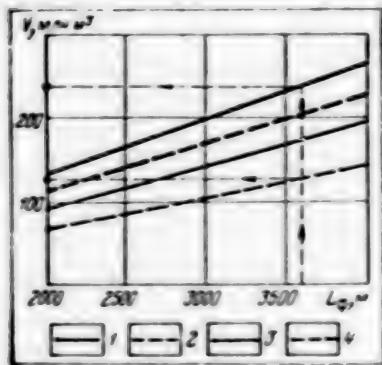


Figure 1. Relation of the overburden volume  $V$  to the length of the working front  $L$  at varying angles of slope of the open pit mine's working flank  $\phi$  and volumes  $Q_y$  of coking coal mined.

Key: 1—, 2—, 3—, with  $\phi$  equalling, respectively,  $12^\circ$ ,  $15^\circ$  and  $19^\circ$ , and  $Q_y = 7$  million t; 4— $\phi = 12^\circ$  and  $Q_y = 1.5$  million t.

The volume of overburden work can be substantially reduced by increasing the angle of slope of the open-pit mine's working flank (Figure 2). If the existing angle of slope ( $12^\circ$ ) is reduced and mining operations are concentrated to two sections so that 7 million t of coal are mined, the volume of the overburden comes to 184 million  $m^3$ , and where the working flank's angle of slope is increased to  $15^\circ$ , it will be 157 million  $m^3$ . The development of only three new 25-meter-high benches while keeping the heights of the presently worked-out benches and the widths of the working areas unchanged will reduce the volume of overburden work by 17 million  $m^3$ . This is why the other important direction for stepped-up mining operations is the increasing of the angle of slope of the working flank as a result of going over to the development of new 20-25-meter-high overburden benches, and the decreasing of the widths of the working areas on the benches down to 67 m while simultaneously using two excavators to load the blasted rock mass.

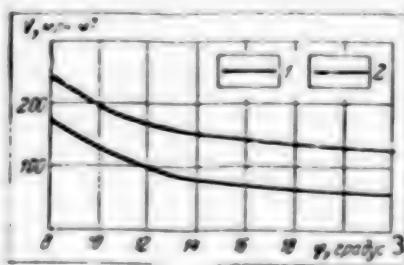


Figure 2. Relation of the overburden volume  $V$  to the open-pit mine's working flank angle of slope at annual volumes for mining coking coal of 1.5 million t (1) and 7 million t (2). 3—, in degrees.

On the four upper overburden benches the existing position of the mining front makes it possible to start mining coking coal at the same time that the volume of work in developing new horizons on the lower horizons and open-cut mining is kept extremely high. In connection with this, the speed at which the front is moved on the individual horizons should be controlled, for which two excavators are needed in the operation on the upper benches, with no less than three or four excavators on the development and finishing off of the lower overburden horizons. The possible rates at which mining operations might be extended while they are temporarily concentrated in two sections, their dependence on the length of the mining operations front, the height of the newly developed overburden benches and the total annual productivity of the excavators, are shown in Figure 3.

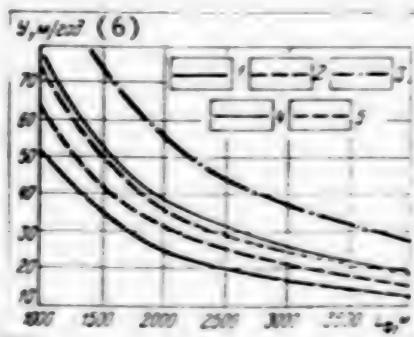


Figure 3. Rates for extending mining operations  $U$ , depending on the length of the mining operations front  $L$ , the height of the overburden benches being developed  $H$  and the total annual productivity of the excavators on the development  $Q_d$ :

Key: 1--, 2--, 3--with  $H=15$  m and  $Q_d$  equals, respectively 7, 10 and 15 million  $m^3$ ; 4-- and 5--with  $H$  equalling, respectively 25 and 30 m and  $Q_d=1.5$  million  $m^3$ , 6--Mining operations extension, m/year.

Thus, in an effort to accelerate the start-up of coking coal mining at the Neryungrinskiy Open Pit Mine, mining operations at the Southwestern section of the open-pit mine need to be temporarily suspended, after having increased mining operations at the Northwestern and Western sections, and we need to increase the angle of slope on the working flank to  $15^\circ$  by increasing the height of the recently developed overburden benches to 20-25 m and bringing the width of the working areas to 66-67 m.

The implementation of these measures will permit the volume of overburden operations to be reduced by 85-100 million  $m^3$ , for the purpose of extracting 7 million t of coal per year.

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COAL

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## REDUCING COAL LOSSES IN TRANSIT

Moscow UGOL' in Russian No 5, May 85 pp 52-55

[Article by V. M. Ivanov, doctor of technical sciences, I. V. Radovitskiy, candidate of technical sciences and L. V. Semenov, candidate of economic sciences, of IGI (Institute of Combustible Minerals): "Economy and Rational Utilization of Fuel-Energy Resources: An Effective Method of Eliminating Coal Losses In Transit"]

[Excerpts] Today's coal industry is a large-scale, highly-developed sector of the country's fuel-energy complex. It is made up of hundreds of large high-capacity underground mines, dozens of open-pit mines and enrichment mills, as well as coal industry machine-building and construction industry enterprises. The economic ties of the coal industry with all sectors of the national economy are constantly being expanded. The industry works in close cooperation with the country's transport network, and together they form a unified production-transport system which supplies many thousands of consumers with fuel and raw materials. The basic coal supply as well as practically all of the coal concentrate produced in the sector are delivered to the consumers via rail transport. Solid fuel is shipped from east to west for the most part. This is the direction in which massive shipments of coal are shipped for the greatest distances in the country--from 1,200 km (Karaganda-Urals) to 4,000 km (from the Kuzbass to the Ukraine). In this connection, utilization of the Kuznetsk Basin coals is some 30-50 percent more effective than for Donets Basin coals at the demand points in European areas.

Since the point in time when the Urals-Kuznetsk Combine--the country's new coal and metallurgical center--was organized, shipments of Kuznetsk coals and concentrate to the Urals have increased substantially. They are shipped along the coal routes in heavy-freight all-purpose gondola cars which develop speeds of up to 100 km/hour and more along the Transsiberian Main Line. Research conducted by the Novosibirsk Rail Transport Engineers' Institute, the IGI and other organizations has established that on the Novokuznetsk-Magnitogorsk leg, at a freighting distance in the neighborhood of 2,200 km, losses of coal concentrate high in grade 6-0 concentrate, which losses are caused by the coal being blown off the cars, amount to from one to 2.5 t for each gondola car.

As is well known, IGI has developed a procedure, and the IOTT [Institute of Concentration of Solid Fuel Minerals] has designed equipment, the installation

Our country's first pilot operation for applying protective emulsion coatings onto the surface of the concentrate after it has been loaded into the gondola cars has been developed at the Abashevskiy TsOF [Central Enrichment Mill], and since 1975 they have been classified as commercial coatings. During a 10-year period, utilization of these coatings has saved 140 t of coking concentrate, and the overall economic effect amounted to R2,463,000.

The coal industry in harness with railroad transport are links in our unified all-union national economic coal-supplying system. That is why, from the national economic point of view, the carrying out of energy-saving measures in coal industry enterprises is critically important for this and other sectors. If in-transit losses of fine-grade coals along the railroads, which losses according to some estimations amount to 4.5-5 million t per year, are to be eliminated, then, respectively, the coal industry will see increased sales of its output, and the railroad transport system will increase the volume of shipments for the national economy. And in this case, the transport industry's freight turnaround has increased as a result of the boost in the use of the existing rail car fleet and the concomitant reduction of shipping costs. In this connection, it can hardly be acknowledged as normal when a number of sectors of the national economy (including transport organizations) take practically no responsibility for disruptions in deliveries, for unfulfilled services and what's more, they have been freed from paying the corresponding fines [2].

There is no question that greater demands must be put on the railroad transport organizations in the area of eliminating in-transit losses from the national economy's freight shipments, as well. In due course, ICI scientists recommended the construction of installations for applying protective emulsion coatings, first of all at major coal-gathering stations and railroad junctions uptrack of the outgoing track routes on the mail lines. With the installations being thus disposed, we gain a number of organizational-technical and economic advantages. The point is that during step-by-step loading of the gondola cars at the coal enterprises, when they undergo the jolts of the hopper chute (as the cone-shaped piles of coal are formed), it is extremely difficult to do a good job of packing the coal with the compactor and applying an even protective coating. The frequent start-ups and stops in the supply of emulsion lead to its overexpenditure, and reduce the installation's productivity. It is obvious that the most efficient method is to apply the protective coating after the coal has been loaded and compacted, when the consist of gondola cars has been formed up and is in non-stop motion beneath the jet spray unit. It takes only 20-30 seconds to treat each moving gondola car, and this greatly improves the installation's productivity. From this point on, with the requisite interest on the part of MPS [Ministry of Railways] organizations, it would be advisable for the construction of the units which will apply the protective coating onto bulk loads to be carried out on a share basis. These units can also be used to protect iron ore concentrate from blowing off. Losses of this material in transit have increased markedly in recent years, as shown by numerous investigations.

At present, installations for the prevention of in-transit coal losses are being built and are in operation solely at coal industry enterprises. Workers from a number of USSR Minugleprom subdivisions and production associations are focussing their constant attention on solving this critical problem of the national economy. Based on the positive results of the joint efforts of the developers (IGI), the designers (IOTT) and the creators (personnel of the Yuzhkuzbassugol' [Southern Kuzbass Coal] and the Karagandaugol' associations) from the first commercial installations for the application of these protective coatings, December 1975 saw the adoption of a resolution concerning their being designed and built in a number of coal basins. In this connection, and guided by the plan for disposition of the installations, which plan was worked out by Tsentrorgiproshakht [Central State Mine Planning Institute], Giproshakht [State Mine Planning Institute] was charged with developing a type design for the installation, and this design was produced in a number of versions applicable to the volumes of coal shipped by the enterprises.

Based on the volume of shipments of coal and primarily coking concentrate, and the distances they are to be shipped, the plan developed by Tsentrorgiproshakht calls for the construction, as the first order of business, of 35 of these installations. This will make it possible to treat 101.5 million tons of coal shipments per year. The overall amount of capital investments for these installations has been set at R26.2 million. As the second order of business, it has been proposed that 17 more installations be built, with capital investments for this purpose coming to R10.6 million. Thus, in all, the plans call for the construction of 52 installations for the protection from wind erosion of 146.7 million t per year of coal which has been loaded into gondola cars. Use of these installations will save 1.9 million t of coal per year. The anticipated economic effect has been estimated at R15.20 million per year, and the time needed to pay back the capital investments has been set at within 1.5-2 years.

The economic advantages of building and operating these installations have been determined by two basic factors: the relatively high output-capital ratio (capital intensiveness) of both coal extraction and the production of high-quality concentrate, and the high labor-intensiveness of coal extraction. As is common knowledge, capital outlays for the increase in coal extraction during the construction of Donbass mines have reached R100-120 per ton, and on the order of R30 per ton for the construction of enrichment mills. The absence of outlays for heavy physical labor in the operation of these installations is of substantial social import.

The question of the composition of the basic products considered advisable for use as protective coatings has been thoroughly studied in the IGI and other institutes. They determined that it was best to utilize waste petroleum products (SNO) [waste petroleum mixtures] to make up the protective emulsion. These products consist of mixtures of industrial petroleum wastes and used lubricating oils not meant to be recycled. According to data from the Vtor-nefteproduct [Secondary Petroleum Product] All-Union Association, there are sufficient waste oil resources to completely meet the needs of all the installations for protecting coal from blowing off rail cars, and this includes both active installations and those slated for construction.

Petroleum waste-based compositions have been approved on an industrial scale and have, in this connection, produced excellent results. Spent petroleum wastes are a versatile product suitable for use at installations both for protecting coals from wind erosion as well as for preventing the freezing and freezing adhesion of the coals while they are being shipped. In delivering the SNO group petroleum waste products via railroad transport from the oil-reclamation stations and considering their low wholesale price (R23-25 per ton), the outlays for their local use will be an average of two-thirds to one-half lower in comparison to outlays for the mazut now in use at the installations which apply protective coatings to coal. Having a lower congelation temperature than mazut, spent petroleum products (petroleum wastes), when being used in pure form at the installations, require no preheating during the summer, and in the winter the outlays for the fuel used to heat them are several times less than for mazut. Outlays of the petroleum waste products used to treat one gondola car come to 80 kg against 50 kg of the mazut used in the emulsion composition. That is why it is sound practice to use SNO group petroleum products in the makeup of aqueous emulsions as well. When used as an emulsion, outlays of petroleum wastes can be reduced by one-half, however, its composition must be made up of three components; for the emulsion to be stable, it needs a 7-10 percent addition of mazut, which contains natural emulsifying substances. Here, the viscosity of the protective composition is increased somewhat, but at the same time the coating applied to the surface of the coal is made more durable.

The comparative indicators for the protective compounds under discussion are shown in Table 1:

(1)	(2)	(3)	(4)
(5)Мазут М-100 (50%) (6)Вода (50%)	100	2.0 {8}Летом 70-75 {9}Зимой 50-90	
(7)Несолидные продукты СНО	80	1.9(10)Летом без подогрева (9)Зимой 30-40	
(7)Несолидные продукты СНО (40%) (5)Мазут М-100 (10%) (6)Вода (50%)	100	1.2(10)Летом без подогрева (9)Зимой 40-50	

Key: 1--Protective compound; 2--Outlays per gondola car, kg; 3--Expenditures for UV product, rubles; 4--Temperature to which compound is heated, °C; 5--M-100 mazut; 6--Water; 7--SNO group petroleum wastes; 8--Summer; 9--Winter; 10--Summer (no preheating)

The design for the installation for applying the protective coatings of oil wastes was developed by Giproshakht in two versions, which can treat 200 or 400 gondola cars per day (in the design, these waste products bear their former NPP [Film-forming Petroleum Product] designation). Considering the fact that

in accordance with the balance of electric power at enterprises in a number of regions it is still possible to use electric power, the planning organizations need to work out a modification for heating the protective compound with electricity instead of building or expanding existing boiler houses. This would reduce the capital outlays as well as the time spent in building the installations. It is a good idea to use series-manufactured pre-heating elements (electrical instruments, including flexible heating bands), so as to make sure that the electric power is strictly metered precisely at such time when it is needed, and depending on the ambient air temperature. This process is easily automated through the use of temperature sensors.

During the mass construction of the installations for applying the protective coatings, which construction has been presently developed and which is planned for the future, the experience gained from the projects which have already been completed is quite important. Thus, a number of the plans call for the construction of general-purpose facilities, and this markedly increases the estimated cost for the installations. First and foremost this concerns costly facilities, such as boiler houses which are built or renovated considering the needs of the enterprises. That is why it is inadvisable to direct all the expenditures to the installation, and we also need to take into account only the portion of the proportional cost of the steam required by the installation. In certain instances, facilities which belong directly to the technological enrichment network at the mills, elevated crossings over railroad lines etc., are included in the estimates for construction of the installations. This all leads to disparities in the planning indicators, misrepresentations of the actual capital intensiveness of the procedures for preventing coal losses, increases of up to 5-7 years in the time needed to repay the capital investments for individual installation projects. For purposes of comparison, Table 2 presents the planning data for certain installations.

The long-range USSR Power-Production Program calls for capital outlays for energy-saving measures to amount to half as much as outlays for the introduction of new capacities for producing fuel-energy resources. By carrying out a combination of measures aimed at saving fine-fraction coals from being blown off rail cars in transit, coal industry enterprises are solving the state's problem of intensifying the utilization of hard- and liquid-fuel resources in the national economy. In addition, they are encountering difficulties in supplying the installations for protective coatings for coal with petroleum products, since at times the workers from the petroleum-supply and other organizations underestimate the significance to the national economy of this new trend in the utilization of liquid fuel (mazut and petroleum wastes).

The petroleum products allocated for the protective installations are finding effective repeated use. Thus after lubricating oils are used for their primary purpose, they can serve as the hydrocarbon base of the protective compositions, wherein the physico-chemical properties of petroleum products are manifested, i.e. their adhesive capabilities, and their ability to form a durable film on the surface of fine-fraction coals. And finally, when fuel consumers burn these petroleum products along with the coal, the chemical energy contained in the very substance of both solid and liquid organic fuel, is put to good use.

Table 2.

ТАБЛИЦА 2		(3)	(4)		(5)	(6)	(8)	
(1) Институт	(2) Объект строительства установки	ГДОВАН ОТ ИМЯННОГО КОМПОНИЕНТА, МЛН. РУБ.	Капиталовложение		Вид защитного покрытия	Количество сберегаемого угля, тыс./т	Ожидаемый годовой экономический эффект, тыс. руб.	Срок окупности, лет
(a) ДонгипроПМЭТ	(a) ЦОФ «Чумаковская объединения «Донецктульгобогащение»	2.4	0.899	0.38	(a) Водомазутная эмульсия	38.0	829	1.1
(b) Южгипрошахт	(b) ЦОФ «Суходольская объединения «Ворошиловградуглеобогащение»	3.1	1.93	0.62	(b) Эмульсия из нефтеотходов	24.6	345.7	5.5
	(c) ЦОФ «Командантская объединения «Донбассантрацит»	2.4	2.2	1.91	(c) То же	20.0	291	7.0
(c) Сибгипрошахт	(d) ЦОФ «Беловская» объединения «Ленинградуголь»	4.5	0.672	0.15		38.0	291	1.0

## Key:

- 1--Institute
  - a--Dongiproshakht
  - b--Yuzhgiproshakht
  - c--Sibgiproshakht
- 2--Facility building the installation
  - a--Donetskugleobogashcheniya [Donetsk Coal Enrichment] Association's Chumakovskaya TsOF [Central Enrichment Mill]
  - b--Voroshilovgradugleobogashcheniya [Voroshilovgrad Coal Enrichment] Association's Sukhodolskaya TsOF
  - c--Donbassantratsit [Donbass Anthracite] Association's Komendantskaya TsOF
  - d--Leninskugol' Association's Belovskaya TsOF
- 3--Annual shipment of coking concentrate, millions of tons
- 4--Capital investments
  - a--Overall, millions of rubles
  - b--specific, in rubles per ton
- 5--Type of protective coating
  - a--Water-mazut emulsion
  - b--Petroleum waste emulsion
  - c--Same as "b"
- 6--Amount of coal saved per year, 1000's tons
- 7--Anticipated annual economic effect, 1000's of rubles
- 8--Time needed to repay capital investments, in years

A special feature of using coking coal concentrate at the final stage is its thermochemical conversion. Together with the coal charge, the coking process is also subjected to the hydrocarbon portion of the protective coating (petroleum product), which constitutes up to 0.1 percent of the charge. According

to data from the literature, during pyrolysis of the hydrocarbon additive, a sequence is formed, of 10 percent coke, 30 percent resin, 10 percent raw benzene and 50 percent coking gas.

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CSO: 1822/270

**SYNOPSIS OF ARTICLES IN UGOL UKRAINY, FEBRUARY 1985****Kiev UGOL UKRAINY in Russian No 2, Feb 85 pp 47-48****UDC 622.333.003.13 "Sverdlovantratsit"****IMPROVING PRODUCTION EFFICIENCY IN SVERDLOVANTRATSIT ASSOCIATION****[Synopsis of article by G. A. Chitaladze, pp 2-5]**

**[Text] Technical and organizational solutions in the Sverdlovantratsit Association to overcome lags and ensure the steady and successful operation of coal enterprises. Tasks for 1985. Two tables. Four illustrations.**

**UDC 622.658.387.61 "Moskovskaya Mine"****MOSKOVSKAYA MINE FULFILLED ITS TASKS FOR 11TH FIVE-YEAR PLAN AHEAD OF SCHEDULE****[Synopsis of article by N. D. Sidorenko, pp 6-8]**

**[Text] Achievements of the Moskovskaya Mine of the Shakterskantratsit Association. Organization of socialist competition, development of initiatives and dissemination of advanced experience. Fulfillment of the plan, increased obligations. Four illustrations.**

**UDC 622.01:658.387.61 "Yenakiyevskaya Mine"****YENAKIYEVSKAYA MINE GREETS 50TH ANNIVERSARY OF STAKHANOVITE MOVEMENT****[Synopsis of article by A. Ya. Kugler, pp 9-10]**

**[Text] Achievements of the Yenakiyevskaya Mine of the Ordzhonikidzeugol Association in the 11th Five-Year Plan. Work of production efficiency experts and innovators. Socialist competition.**

**UDC 622.208.13 "Kuybyshevskaya Mine"****ACCELERATED DRIVING OF INCLINED DRIFT BY DRILLING-BLASTING METHOD****[Synopsis of article by A. T. Shepelev, pp 10-11]**

[Text] Accelerated tunnelling of an inclined ventilation conduit at the Kuybyshevskaya Mine with high labor productivity.

#### ORGANIZATION OF HIGHLY PRODUCTIVE LABOR IN CONVEYOR TRANSPORT SECTION

[Synopsis of article by Ye. I. Ivanova, p 11]

[Text] Accident-free work by conveyor transport section headed by V. S. Shatokhinny of Velikomostovskaya Mine No. 10 of the Ukrzapadugol Association. One illustration.

UDC 622.333 "Mine imeni 22nd CPSU Congress"

#### LINES IN OUR GLORIOUS HISTORY (50TH ANNIVERSARY OF STAKHANOVITE MOVEMENT)

[Synopsis of article by B. L. Kaganovich, pp 12-14]

[Text] Origin of the Stakanovite movement. Its consequences.

UDC 622.273.122.06:622.224.3

#### IMPROVING PREPARATORY AND FINISH WORK OF MINING SECTION AT DEPTH

[Synopsis of article by Yu. K. Batmanov and G. G. Poznyakov, pp 15-17]

[Text] Analysis of technical and technological solutions on the preparatory and finish work of mining sections as a factor in the occurrence of rock pressure connected with the preparatory work of a stoping face. A new technological method proposed for the finish work of a mining section. Four illustrations. Bibliography with four references.

UDC 622.261.2:622.232.8

#### IMPROVING DRILLING-BLASTING METHOD OF DRIVING DRIFTS

[Synopsis of article by S. K. Strizhiboroda, V. P. Shirokikh, V. N. Zenyakin and A. S. Popovich, pp 18-19]

[Text] Integrated solution to problems of mechanizing basic and auxiliary operations by producing multi-operation machines with a unit of attached and interchangeable special-function equipment. Two illustrations.

UDC 622.013:658.7:658.516.3

#### STANDARDIZATION, MATERIAL-TECHNICAL SUPPLY

[Synopsis of article by I. M. Yamko and V. L. Kondratov, pp 19-20]

[Text] Necessity of employing standardizing methods in the field of material and technical supply.

UDC 622.013.003.12 "Almaznoye Mine Administration"

WAYS OF REDUCING MATERIAL, LABOR COSTS BY SHEARING EXTRACTION

[Synopsis of article by V. G. Yedomenko, pp 20-21]

[Text] Analysis of use of shearing facilities in the Almaznoye Mine Administration of the Donbassantratsit Association. Principal ways of cutting costs by shearing extraction. Suggestions for improving labor productivity.

UDC 622.831.32

TECHNICAL-ECONOMIC ASSESSMENT OF USE OF ARRAY OF MEASURES TO COMBAT ROCK BURST

[Synopsis of article by I. F. Ponomarev and D. I. Khodyrev, pp 21-22]

[Text] Methodology of economic assessment of measures to combat rock bursts in the mines of the Central Donbass Region. One table. Bibliography with three references.

UDC 622.284.5:622.232

RESEARCH ON IUKP MECHANIZED SUPPORTS UNDER DONBASS MINE CONDITIONS

[Synopsis of article by I. A. Kiyashko, V. P. Serdyuk and N. T. Tenishev, pp 24-25]

[Text] Results of mine experiments with IUKP mechanized supports under conditions of the No. 2 south longwall with unstable roof at the Krasnolimanskaya Mine, and at the No. 2 north longwall with seldom-collapsing rock roof at the Molodogvardeyskaya Mine. One table. Two illustrations.

UDC 622.23:622.815:622.284.54

MINE TESTS OF SAFETY DEVICE FOR DIAGONAL FACE OF INCLINED BEDS

[Synopsis of article by D. V. Dorokhov, Yu. A. Kolesnikov and I. N. Seleznev, pp 26-27]

[Text] Structure of face safety device created on the base of pneumatic cushion support, and technology of operations to move the safety device and deal with the roof with the aid of a rubble strip. Three illustrations. Bibliography with one reference.

UDC 622.284.54

SAFETY-VALVE HYDRAULIC-PROP SYSTEM OF MECHANIZED SUPPORT

[Synopsis of article by A. A. Bayev, pp 28-29]

[Text] Results of comparative tests of a hydraulic prop-valve system with an

overflow mains system under dynamic load and with various configurations of hydraulic props and valves. Conclusions and recommendations. Two tables. Three illustrations.

UDC 622.455.7.004.18

#### AIRLOCK TO REDUCE ENERGY LOSSES AT MINE

[Synopsis of article by V. P. Vereshchagin, V. I. Myalkovskiy and V. Ya. Oleynik, p 30]

[Text] Results achieved at the Mine imeni S. Ordzhonikidze of the Makeyevugol Association to seal the mouth of a ventilation shaft with the aid of an air-lock. Two illustrations.

UDC 622.532

#### PRODUCING PUMPING UNIT FOR HYDRAULIC MOVEMENTS BASED ON PUMPS FOR WETTING ROCK MASS

[Synopsis of article by Ya. D. Reka and B. I. Gipsh, pp 30-31]

[Text] Results of tests on experimental pump units for hydraulic movements based on pumps for wetting rock mass. One illustration.

UDC 622.24.053.94

#### PRODUCING NEW TYPES OF STABILIZERS FOR DRILLING MACHINES

[Synopsis of article by M. S. Safokhin, I. D. Bogomolov and K. V. Nachev, pp 31-33]

[Text] Structural and layout features of various types of stabilizers. Classification of stabilizing devices. Three illustrations.

UDC 622.6.002.2

#### SEPARATE TRANSPORT OF COAL, ROCK WHEN DRIVING DRIFTS

[Synopsis of article by G. Ya. Palant, S. Yu. Kravchinskiy and A. N. Chupika, p 34]

[Text] Technological plan for accumulating coal and rock using PS-3.5 sectional trains (or VDK-2.5 carts) with bottom unloading. System developed by Donugi /Donetsk Scientific Institute of Coal/. One illustration.

UDC 622.411.33:533.17:622.817.4

#### AUTOMATIC MONITORING OF METHANE ACCUMULATIONS IN DRIFTS

[Synopsis of article by A. I. Bobrov, pp 35-36]

[Text] Recommendations on monitoring the ATV-3 analyzer of local accumulations of methane in mine drifts. Location of level detector in drifts.

UDC 622.822.22:622.232.52

#### ELIMINATING SPONTANEOUS COMBUSTION OF COAL BY HIGH-PRESSURE STREAMS OF WATER

[Synopsis of article by P. S. Pashkovskiy, V. M. Kravets and G. B. Tynda, pp 36-37]

[Text] Basic technological system for actively (without isolation of sector) putting out an internally generated fire. Area of application of method of extinguishing spontaneous combustion of coal by high-pressure streams of water. One illustration.

UDC 622.831.32

#### CORRELATION OF PRESSURE AND TEMPERATURE OF COAL MASS IN BURST-PRONE BEDS

[Synopsis of article by P. A. Reypolskiy, p 37]

[Text] Function of change in temperature on pressure of a coal mass in burst-prone beds. One illustration.

UDC 553.93:622-112:551.252:556.3.06(477.61/.62)

#### EFFECT OF ROCK JOINTING ORIENTATION ON MAGNITUDE OF WATER SEEPAGE INTO MINES

[Synopsis of article by P. G. Artemenko and V. N. Savitskaya, p 38]

[Text] Predicting the magnitude of water seepage into mines of the anthracite areas of the Ukrainian Donbass as a function of the orientation of tectonic fissures in coal-bearing rock. One illustration.

UDC 622.834.1

#### OPTIMUM INTERVAL FOR ESTABLISHING REFERENCE POINTS ON CONTOUR LINES

[Synopsis of article by S. I. Bocharov and I. Yu. Ivanov, pp 38-39]

[Text] Overall methodology for calculating the optimum interval between reference points of a contour line of an observation post when studying shifts in the earth's surface above drifts. One table. One illustration. Bibliography with four references.

UDC 553.93/.95(477):622.01

#### OUTLOOK FOR RATIONAL UTILIZATION OF COKING RAW MATERIAL BASE IN UKRAINE

[Synopsis of article by S. D. Pozhidayev, N. P. Tkachenko and V. P. Babenko, pp 40-41]

[Text] Expanding the raw material base of coking based on gas coal. Integrated program to expand the raw material base of the UkrSSR coke chemical industry.

UDC 622.799-17.004.8

#### PRODUCING BRICKS FROM ANTHRACITE PROCESSING WASTES

[Synopsis of article by A. M. Kotkin, Yu. M. Rubin, N. F. Lyakh and V. I. Mikhaylov, pp 41-42]

[Text] Results of research on selecting a mixture and on the technological procedures for producing bricks from coal-processing wastes of the Komendant-skaya TsOF /Central Processing Plant/. Research data under plant conditions during output of experimental-industrial batch of bricks. Three tables.

UDC 622.281:658.589

#### TRENDS IN DEVELOPMENT OF MINE-DRIFT SUPPORT EQUIPMENT

[Synopsis of article by Kh. I. Abramson, pp 42-44]

[Text] Analysis of status of mine-drift support equipment in the country's mines. Outlook for use of traditional and new progressive types of support. Two tables.

UDC 666.971:622.257.1

#### IMPROVING PROPERTIES OF TAMPOONAGE SLURRIES

[Synopsis of article by A. B. Litvinova and N. I. Pereslavtsev, pp 44-45]

[Text] Improving the rheological parameters and setting times of tamponage slurries, increasing strength of cement and increasing its waterproofness and corrosion resistance with the aid of a method developed by VNIIOMShS /All-Union Scientific Research Institute for the Organization and Mechanization of Mine Construction/. One table. Bibliography with two references.

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**SYNOPSIS OF ARTICLES IN UGOL UKRAINY, MARCH 1985**

Kiev UGOL UKRAINY in Russian No 3, Mar 85 pp 47-48

UDC 622.333.658.387.62 "Mine imeni 22nd CPSU Congress"

**MINE IMENI 22ND CPSU CONGRESS -- BIRTHPLACE OF STAKHANOVITE MOVEMENT**

[Synopsis of article by Ye. A. Ivomin, pp 3-5]

[Text] Development of the Mine imeni 22nd CPSU Congress of the Stakhanovugol Association. Faithful to Stakhanovite traditions, and adding to them.

UDC.622.232-523.3 "2KM-103"

**ORGANIZING INDUSTRIAL TESTS OF 2KM-103 COMPLEX**

[Synopsis of article by A. P. Fisun, pp 6-8]

[Text] Structure of the 2KM-103 Complex and industrial testing of it on the rear wall of the Oktyabrskiy Rudnik Mine of the Donetskugol Association. Three illustrations.

UDC 622.232.8 "1KM-103"

**PUTTING HEAVY BURDEN ON 1KM-103 COMPLEXES**

[Synopsis of article by A. A. Kamenskiy and N. M. Supryaga, pp 8-9]

[Text] Experience in using the 1KM-103 Complex in mines of the Torezantratsit Association. Operating conditions and technical-economic indicators.

UDC 622.26.65.012.6 "Velikomostovskaya Mine No. 5"

**VELIKOMOSTOVSKAYA MINE NO. 5 -- ENTERPRISE HIGH IN PRODUCTIVE EFFICIENCY, LABOR ORGANIZATION**

[Synopsis of article by V. N. Gusakov, pp 10-11]

Development of the Velikomostovskaya Mine No. 5 of the Ukrzapadugol Asso-

ciation. Successes of the enterprise's collective and mechanization of operations. Obligations and socialists competition. Two illustrations.

UDC 622.232.658.387 "Krasnyy Partizan Mine"

#### HIGHLY PRODUCTIVE EXTRACTION FROM ANTHRACITE BED

[Synopsis of article by G. F. Lavrik and G. A. Dats, pp 12-13]

[Text] Organizing the work of a stoping face miners' brigade headed by N. I. Lebedko of the Krasnyy Partizan Mine of the Sverdlovantratsit Association. Two illustrations.

UDC 622.26.65.012.1

#### RAPID DRIVING OF DRIFTS BY DRILLING, BLASTING METHOD

[Synopsis of article by M. G. Shetser, p 14]

[Text] The technology of rapidly driving a gallery by the drilling and blasting method as employed by the brigade of V. I. Yarov of the Mospinskaya Mine of the Donetsugol Association. The organization of operations.

UDC 622.831.322

#### WORKING STEEP BLOWOUT-PRONE BED BY USING HYDRAULIC EQUIPMENT

[Synopsis of article by I. I. Balinchenko, T. Ya. Mkhavari and N. M. Khvoshchevskiy, p 15]

[Text] Results of an experimental test of the technology of working a steep blowout-prone bed by using the AGSB /expansion not given/ hydraulic facility. One illustration.

UDC 622.232.8.06.002.237(477)

#### ESTIMATING AREA OF APPLICATION OF NICHELESS COAL EXTRACTION

[Synopsis of article by A. I. Shulga and V. I. Teryanik, p 16]

[Text] Area of application of technology of nicheless coal extraction by locating conveyor drives in adjacent drifts, and the possible extent of its adoption in the mines of the UkrSSR 'minuleprom /Ministry of the Coal Industry/. One table. Bibliography with one reference.

UDC 622.268:622.281/.189

#### INCREASING DURABILITY OF DRIFTS, ACTIVE OFF-LOADING AND STABILITY OF BEDROCK

[Synopsis of article by V. B. Voloshin, G. K. Osypa and I. I. Petrenko, pp 17- 18]

[Text] Experience of adopting a method of preventing the swelling of bedrock at the Mine imeni 19th CPSU Congress of the Voroshilovgradugol Association. Parameters, technology and technical-economic effect. One table. Two illustrations.

UDC 622.271.3

#### GEOPHYSICAL RESEARCH AT OPEN PIT MINES

[Synopsis of article by Ye. N. Rudnev, pp 19-20]

[Text] Application of geophysical research at open pit mines to develop and implement environmental protection measures. Recommendations on the conduct of research. One illustration. Bibliography with one reference.

UDC 622.268.13

#### EFFECTIVENESS OF USING TUNNELLING AND CUTTING COMBINES IN MINES OF UKRAINE

[Synopsis of article by I. S. Grankin, S. V. Skorobogatov and V. F. Myshakov, pp 21-22]

[Text] Use of tunnelling and cutting combines, reasons for the decline of technical-economic indicators, and recommendations for improving the effectiveness of combine tunnelling. One table.

UDC 622.01:658.387:658.26

#### ORGANIZING LABOR OF MINING SECTION, ELECTROMECHANICAL SERVICE OF MINE

[Synopsis of article by G. A. Zubarevich, pp 22-23]

[Text] Proposals for improving the organization of labor in a section. Organizing a mine's mechanical service. One illustration. Bibliography with one reference.

UDC 338.9:678.7:622.01

#### EFFECTIVENESS AND OUTLOOK FOR USE OF SPRUT TYPE ADHESIVES IN COAL INDUSTRY

[Synopsis of article by L. V. Denisenko, L. N. Sudnik and T. G. Fedorenko, p 24]

[Text] Economic effectiveness of using Sprut type construction adhesives for the repair and maintenance of the equipment of mines and coal processing plants. Three tables.

UDC 622.284-522-118

#### MECHANIZED PNEUMATIC PROPS, VARIOUS MEANS AND METHODS OF MOVING THEM

[Synopsis of article by M. A. Vitka and V. I. Zimovenko, pp 25-26]

[Text] Means and methods of moving mechanized pneumatic props, mine tests. New method of moving a pneumatic prop based on flexible casings, with unmanned coal mining. Three illustrations.

UDC 622.285.04:622.831.1

#### PRELIMINARY SETTING OF SECTIONS OF MECHANIZED PROPS FOR SLOPING BEDS

[Synopsis of article by I. F. Ivanov and V. A. Zakharov, pp 27-28]

[Text] Results of measurements of the magnitude of initial setting of KGU /expansion not given/ props; connection between a section's tendency to spread and its force parameters. One illustration. Bibliography with two references.

UDC 622.284.74(045)

#### TESTING PROPLESS SUPPORTS FOR DRIFTS CUT IN HYDRAULIC MINES

[Synopsis of article by N. N. Krupin, M. I. Papkov and O. N. Stepanishchev, pp 28-29]

[Text] Results of testing supports for drifts cut at the Pioneer Hydraulic Mine of the Dobropolyeugol Association. Drill-anchor column (KBA) and its use, industrial tests of anchor support. Conclusions. Three illustrations.

UDC 622.445

#### AUTOMATICALLY REGULATED SINGLE-STAGE AXIAL MINE VENTILATOR

[Synopsis of article by V. F. Sennikov, B. S. Falkov and Yu. S. Novozhenin, pp 30-31]

[Text] Structure and results of bench tests of the experimental VOLI single-stage axial mine ventilator, with electromechanical and hydraulic drive of the mechanism for synchronous rotation of the rotor blades during operation. Two illustrations. Bibliography with two references.

UDC 622.233.3:622.235.1

#### UNIVERSAL TOOL FOR WELL-DRILLING IN BLOWOUT-PRONE BEDS

[Synopsis of article by B. N. Shmakov, L. N. Khnykin and S. V. Balamutenko, pp 31-32]

[Text] Structure and operating principles of a drilling tool assembly with movable sections, and equipped with equalizing-damping sections. Two illustrations. Bibliography with two references.

UDC 622.807.15.002.5

#### MECHANIZING WASHING, WHITEMASHING AND SPRINKLING OF MINE DRIFTS

[Synopsis of article by A. N. Polyakov, V. M. Romenskiy and N. L. Kovalenko, pp 32-33]

[Text] Area of application of whitewashing unit, description of its structure and operating principles, and results of acceptance testing of experimental model AP. One table. One illustration.

UDC 622.002.5:621.3

#### STANDARDIZATION OF SYSTEMS FOR UNDERGROUND AUTOMATED EQUIPMENT

[Synopsis of article by V. I. Kobzar and V. M. Kangun, p 33]

[Text] Results of work by Dneprogiproshakht /Dnepropetrovsk State Institute for the Planning of Mines/ to improve systems for automating the underground facilities of coal mines. Examples of standardizing underground automated equipment.

UDC 622.234.12:621.314

#### TPCH-250-5 THYRISTOR FREQUENCY TRANSFORMER FOR NONCONTACT TRANSPORT

[Synopsis of article by G. G. Pivnyak and S. I. Vypanasenko, pp 33-34]

[Text] Operating principle and recommendations for use of TPCh-250-5 mine thyristor frequency transformer for noncontact electrical transport. One illustration.

UDC 622.584:621.644.2(084.2).004.14

#### EFFICIENT DESIGNS OF PIPE CASINGS AND VALVES OF PUMPING FACILITY

[Synopsis of article by N. G. Kartavyj, N. A. Bogomolov and Ye. A. Volovik, p 35]

[Text] Switching designs for the pipe and valve assemblies of multi-unit pumping facilities with high reliability, long life, ease of use and substantially lower number of valves. One illustration.

UDC 624.131.1:622.583.31

#### ENVIRONMENTAL PROTECTION MEASURES IN PROJECT OF MINE IMENI STASHKOV

[Synopsis of article by V. F. Butchenko and B. Ye. Bronshteyn, p 36]

[Text] Measures provided in the project for environmental protection and for reducing the harmful impact of working in the flood plain of the Samara River during the operation of the Mine imeni Stashkov.

UDC 622.411.332:533.17

#### METHANE CONTENT OF OXIDIZED COAL AT LOW STAGE OF METAMORPHOSIS

[Synopsis of article by R. M. Krivitskaya, T. V. Strukovskaya and V. S. Terebilo, p 37]

[Text] Relation of the sorption methane content of poorly metamorphized coal to the stages of its metamorphism, and deviations from the general rule. Role of primary oxidation of coal in the growth of its methane content. Bibliography with two references.

UDC [552.57.08:53]:622.831.32"313"

#### METAMORPHISM AND CORRELATION OF MICRO-, MACRO-POROUS STRUCTURE, MOISTURE CONTENT OF COAL WITH GAS CONTENT OF BEDS

[Synopsis of article by B. T. Akinshin, pp 37-39]

[Text] Specifics of variation in the phase-physical properties of coal in brown-coal, hard-coal and anthracite beds and their gas content in various of the country's coalfields. The basic principles of variation in them are shown, with reference to the problem of predicting gas-dynamic danger in coal-fields. One table. Two illustrations. Bibliography with three references.

UDC 622.411.4

#### EVALUATING GAS CONDITIONS OF ISOLATED SECTOR IN AREA OF FIRE OUTBREAK

[Synopsis of article by I. N. Zinchenko, V. S. Sergeyev and Yu. A. Zhirnyy, pp 39-40]

[Text] Results of theoretical and experimental research on distribution of gaseous contaminants in the drifts of an isolated sector; methods of evaluating gas conditions in the area of a fire outbreak. One table. One illustration. Bibliography with one reference.

UDC 622.23.02:622.02-113

#### PREDICTING REPLACEMENT OF COAL BY TERRIGENOUS DEPOSITS

[Synopsis of article by Sh. V. Gumiroy and V. V. Vodasyuk, pp 40-41]

[Text] Principles of the distribution of fluvial displacements of coal by rock, and their correlation with the paleorelief produced by the thickness of the coal bed. Two illustrations. Bibliography with one reference.

UDC 622.831:551.252:622.272(477.61/.62)

#### EXTENT OF PROPAGATION OF ARTIFICIAL CRACKS IN ROOF OF STOPING DRIFTS

[Synopsis of article by V. P. Subbotin, pp 41-42]

[Text] Multiple correlations between the extent of propagation of artificial cracks in the roof of stoping drifts in mines and underlying geological and

mining engineering factors. Predicting the propagation of cracks at the stage of geological prospecting work.

UDC 622.834.1

FREQUENCY OF OCCURRENCE OF LOCALIZED STRAIN IN FOUNDATION OF STRUCTURES DURING UNDERWORKING

[Synopsis of article by Yu. F. Krenida, V. I. Kovalenko and L. P. Chepenko, p 42]

[Text] Estimating the number of buildings damaged from the occurrence of localized strain in their foundations.

UDC 662.741.3.022:622.7.092:543.822.053.001.4

STATISTICAL ANALYSIS OF PROCESSES OF VARIATION IN COAL QUALITY

[Synopsis of article by A. M. Onishchenko and V. P. Belonozhko, pp 43-44]

[Text] Experimental and probability analysis of variations in content of moisture, ash, sulphur, iron oxides and calcium in coal concentrate on the conveyor. Recommendations for on-stream monitoring and predicting of coal quality indicators. Bibliography with one reference.

UDC 662.6:552.7

METAL CONTENT OF ASSOCIATED ROCK OF DONBASS COAL

[Synopsis of article by F. I. Ganopolskiy, pp 44-45]

[Text] Composition of argillaceous minerals of rock associated with Donbass coal, based on X-ray phase analysis. Principles of variation in mineral content for variation in stage of coal metamorphosis. One table. Bibliography with two references.

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COAL

SYNOPSIS OF ARTICLES IN UGOL UKRAINY, APRIL 1985

Kiev UGOL UKRAINY in Russian No 4, Apr 85 pp 47-48

UDC 658.589:622.333

EFFECT OF RECONSTRUCTION OF GORLOVKA MACHINE BUILDING PLANT IMENI KIROV

[Synopsis of article by V. Ya. Bogomaz, pp 2-3]

[Text] Improving operations of Gorlovka Machine Building Plant imeni Kirov as a result of reconstruction and technical reequipping. One illustration.

UDC 658.386.002.6:622.333

STUDY OF ADVANCED EXPERIENCE BY STUDENTS OF DONETSK BRANCH OF IPK

[Synopsis of article by N. T. Demchenko, D. K. Chuzhinov and M. G. Shetser, p 4]

[Text] Forms and methods of studying and disseminating advanced experience in coal mining sections to improve the qualifications of managerial personnel and specialists in the Donetsk Branch of IPK /Institute for the Improvement of Qualifications/ of USSR Minugleprom /Ministry of the Coal Industry/.

UDC 622.272.6:622.8

METHODS OF PREPARING AND VENTILATING PANELS

[Synopsis of article by B. K. Kuklin, A. G. Lepikhov, M. A. Patrushev and Ye. Ya. Samoylenko, pp 5-8]

[Text] Methods of preparing and ventilating panels, combining technological solutions that have an overall impact on reducing the harmful effects of natural factors. Technical-economic analysis of these methods and their area of application. Five illustrations.

UDC 622.284.25

IMPROVING RECORDS OF MANAGING ROCK PRESSURE WHEN WORKING NARROW INCLINED BEDS

[Synopsis of article by Yu. G. Litvinov, pp 8-9]

[Text] Results of research on the basis of reports on the management of rock pressure in narrow inclined beds. Use of pneumatic chocks as support when managing rock pressure with total cavein and rubble in the length driven.

UDC 622.272+622.031.2:622.233/.235

#### OUTLOOK FOR BLASTING EXTRACTION IN VERY NARROW INCLINED BEDS

[Synopsis of article by V. G. Chernyy, B. I. Vovk and A. L. Yakovlev, pp 9-12]

[Text] Working very narrow inclined beds with explosive energy. Unmanned extraction with use of long-bore explosive charges. Operating experience. One illustration. Bibliography with seven references.

UDC 624.138.4:622.01

#### CHEMICAL STABILIZING OF COAL-BEARING MASS WITH PLACTICIZED CARBAMIDE COMPOUND

[Synopsis of article by N. N. Tomashev and O. R. Zmiyevskaya, pp 12-13]

[Text] Data on new compound based on carbamide resin plasticized by polyvinylacetate dispersion. The compound's effectiveness in stabilizing a coal-bearing mass in the Abayskaya Mine of the Karagandaugol Association. Two illustrations.

UDC 622.013:622.26

#### ESTIMATING LABOR INTENSIVENESS OF COMPLEX PRODUCTION PROCESSES

[Synopsis of article by V. A. Karmazin, pp 14-15]

[Text] Magnitude and structure of labor intensiveness of technological processes and the process of driving drifts. Nature of variation in fixed, arbitrarily fixed, and changeable labor costs. Practical significance of conclusions arrived at.

UDC 622.333:658.5

#### RESEARCH ON CORRELATION BETWEEN CAPITAL-LABOR RATIO, LABOR PRODUCTIVITY IN COAL INDUSTRY

[Synopsis of article by R. S. Karenov, p 16]

[Text] Analysis of relation between increase of labor productivity and its capital-labor ratio in the coal industry. One table.

UDC 622.232:621.398

TELEMECHANICAL SYSTEM OF MODERNIZED APPARATUS FOR AUTOMATING KGU-D COMPLEX

[Synopsis of article by L. B. Balakerskiy, A. K. Kolomiytsev and Ye. M. Leshchinskii, pp 17-18]

[Text] Structure of automating apparatus and operating principles of telemechanical system designed to control movable sections of hydraulic support in automated and remote modes and in monitoring mode. One illustration.

UDC 622.621.311.1

USE OF ELECTRIC POWER IN INCLINED BEDS SUBJECT TO SUDDEN BLOWOUTS

[Synopsis of article by Yu. T. Razumnyy, V. N. Gerasimovich and I. M. Vedmedev, pp 18-19]

[Text] Electrification of sections in narrow beds of mines subject to sudden blowouts of coal or gas. Actual data on adoption at mines of the Central Donbass Region of design solutions to convert machinery from pneumatic power to electrical.

UDC 622.234.5:622.272

HYDROMECHANICAL ACTUATING DEVICES FOR STOPING, TUNNELLING COMBINES

[Synopsis of article by I. A. Kuzmich and Yu. A. Tolchenkin, pp 19-21]

[Text] Structure of hydromechanical actuating devices for stoping and tunnelling combines, their operating capacity, simplicity of manufacture and effectiveness of use. Two illustrations.

UDC 622.285.822

MINE TESTS OF IMPROVED HYDRAULIC PROPS OF MECHANIZED SUPPORTS

[Synopsis of article by Yu. F. Ponomarenko, Yu. S. Panchekha, and P. Ye. Semik, pp 21-22]

[Text] Results of tests performed at the Mine imeni SOCIALISTICHESKIY DONBASS Newspaper of the Donetsugol Association on the IM-87um props with improved service life. Two illustrations.

UDC 622.822.7:614.842.615

MECHANIZED FILLING OF DOMES AND CAVITIES WITH SUPPORT OF HARDENING FOAM

[Synopsis of article by Ye. M. Solonitsyn and V. K. Kulbachko, pp 22-23]

[Text] Specifications of materials designated for mechanical filling of domes

and cavities, and comparison with conventional materials. Producing hardening foam. Installation and its technical characteristics. Practical use. One illustration.

UDC 621.313.13:622.002.5.004.62

#### IMPROVING RELIABILITY OF ELECTRIC MOTORS FOR FIXED FACILITIES IN MINES

[Synopsis of article by V. D. Glavnny, L. A. Zbarskiy and N. N. Konokhov, pp 23-24]

[Text] Results of experiments on reliability of VA02 blast-proof asynchronous electric motors with a capacity of 132-315 KW with special design of stator recess.

UDC 622.625.28-843

#### EXPERIENCE OF PRODUCING, OPERATING D8 BLASTPROOF MINE DIESEL ENGINE

[Synopsis of article by D. V. Khalangot, pp 24-26]

[Text] D8 diesel engine for operation in mines of any gas type. Conditions and results of operating at several mines. Two tables. One illustration.

UDC 622.289.7(04)

#### DELIVERING LUMBER MATERIALS TO STOPING FACES OF INCLINED BEDS

[Synopsis of article by Yu. I. Kuznetsov, V. V. Gurenko and A. A. Rybyanets, pp 26-28]

[Text] Mechanized delivery of lumber materials to the longwalls of inclined beds by the PLK lumber hoist and the UDL lumber transport device. Structure, designation and technological operating methods of the devices. Two illustrations.

UDC 622.01:621.63(083.74)

#### INTERNATIONAL STANDARDS FOR MINE BLOWERS

[Synopsis of article by I. A. Raskin, p 28-29]

[Text] New CEMA standards have been approved for blowers for main and local ventilation, which define the parameters and technical specifications for the blowers. Principal aspects of the new CEMA standards. Four tables.

UDC 622.445:621.634+621.635.001.5

#### AERODYNAMIC CHARACTERISTICS OF BLOWER UNIT

[Synopsis of article by G. A. Babak, pp 29-30]

[Text] KPD blower units compared with mine blower facilities for main ventilation. Aerodynamic characteristics of the blower units. One table.

UDC 678.5:628.35.004.14:6 22.333

#### USE OF SEDIMENT FROM BIOLOGICAL PURIFICATION OF WASTE WATER TO SPRAY TAILINGS

[Synopsis of article by O. G. Bobrov, Yu. S. Zaytsev and Yu. V. Nessariyskiy, pp 30-31]

[Text] Results of experiments on the use of sediments from the biological purification of waste water to spray mine rock tailings and prevent their spontaneous combustion. One table.

UDC 622.815:622.831

#### INCREASE OF SEISMIC ACTIVITY IN NONBLOW-OUT PRONE ZONE

[Synopsis of article by A. S. Chechel, pp 31-32]

[Text] Experience of using seismic forecasting in working a bed at the Perevalskaya Mine of the Voroshilovgradugol Association, and cause of high seismic activity in a virtually blowout-free zone. Recommendations for more effective use of seismic forecasting under difficult mining and geologic conditions. Two illustrations.

UDC 622.457.5-768:661.185

#### SEALING VENTILATOR OPENINGS WITH POLYURETHANE FOAM

[Synopsis of article by V. K. Salnikov, D. A. Palchik and I. P. Pereverzev, pp 33-34]

[Text] New-formula PPU-I polyurethane, and main parameters of the technology of applying it to openings. Experience of using PPU-I polyurethane at Mine imeni Zasyadko. Three illustrations. Bibliography with one reference.

UDC 622.824.001.5

#### FIRE PREVENTION FOR ENTIRE LENGTH OF CONVEYOR BELTS

[Synopsis of article by Ye. V. Kurbatskiy, pp 34-35]

[Text] Two basic alternatives of fire prevention for entire length of conveyor belts using water or foam as the extinguisher. Parameters of foam and water spraying facilities. Experimental facility to protect the linear portion of a conveyor belt at the Kirov Apatit Mining Association. Two illustrations.

UDC 622.831.3:533.17

## EFFECT OF LOAD ON PERMEABILITY OF COAL BEDS

[Synopsis of article by Yu. D. Piskunov, pp 35-36]

[Text] Methodology and results of research on the filtration properties of the periphery of coal beds having various mechanical properties under the influence of load. Function of variation in gas permeability on burst-prone and blowout-prone coal and on fragmentation-prone coal. One table. One illustration. Bibliography with two references.

UDC 550.3:551.243:622.273

## ELECTRIC GEOPHYSICAL EXPLORATION OF IRREGULARITIES IN BEDS OF MINES OF LVOV-VOLYNSK BASIN

[Synopsis of article by B. F. Matyushechkin, V. Ya. Karavayev and K. K. Kozel, pp 37-38]

[Text] Methodology of discovering and mapping tectonic irregularities of hard-coal beds by various modifications of electrical examination with the aid of the IKS-50 and ShERS-4 devices.

UDC 550.837:622.847:622.01

## GEOPHYSICAL METHODS OF FORECASTING WATER LEAKAGE IN WESTERN DONBASS MINES

[Synopsis of article by D. V. Chirka and A. F. Skvortsov, pp 38-39]

[Text] Results and effectiveness of using integrated geophysical research to forecast locations of possible leakage of underground water into drifts of mines of the Pavlogradugol Association. One illustration.

UDC 622.7:658.56

## CONTROLLING QUALITY OF OUTPUT AND RESOURCE UTILIZATION AT COAL PROCESSING PLANTS

[Synopsis of article by V. P. Yakunin, Sh. Sh. Kipnis and L. P. Mironenko, pp 39-40]

[Text] Developing and adopting KS UKP 1 EIR /expansion not given/ in Ukrainian coal processing plants. Goals, tasks and systems functions; makeup and content of enterprise standards. Incentives for work quality.

UDC 622.831.322

## PRINCIPLES OF DISPERSION BY SIZE OF FRACTURED COAL PARTICLES

[Synopsis of article by A. A. Borisenko, pp 41-42]

[Text] Principles formulated on the basis of experimental data of dispersion

by size of fractured coal particles. One table. One illustration. Bibliography with two references.

UDC 622.257.1:624.138.41

#### TAMPONAGE WORK UNDER DIFFICULT HYDROGEOLOGICAL CONDITIONS

[Synopsis of article by N. V. Mamontov and Yu. A. Veselov, pp 42-43]

[Text] Combined method of tamponage when driving mine shafts under difficult hydrogeological conditions, and methods of injecting slurry.

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CSO: 1822/255

COAL

BRIEFS

DNEPROPETROVSK COLLECTIVE FULFILLS ASSIGNMENT--The imeni 26th CPSU Congress Mine collective (Dnepropetrovsk Oblast) fulfilled their 11th Five-Year Plan assignment ahead of schedule. They brought 5,970 t of coal to the surface. [Text] Moscow EKONOMICHESKAYA GAZETA in Russian No 13, Mar 85 p 3] 12659

NEW DRILL-BLASTING TECHNIQUE DEVELOPED--Alma-Ata--Miners at the largest mine, i.e. the No 65 Yuzhno-Dzhezkazgan, have changed over to a new and more efficient method of drill-blasting operations. It was suggested by coworkers of DzhezkazganNIItsvetmet [Dzhezkazgan Scientific Research Institute of Non-Ferrous Metallurgy]. The method is based on so-called "prismatic cutting", which requires extremely precise calculation. The least deviation effects ore extraction and reduces productivity. The institute's coworkers have discovered a simple, yet efficient solution, the essence of which comes down to the use of ordinary slide projectors at the cutting face. The devines, with the help of previously prepared slides project an optical diagram of the drill-marks for the blast-holes on the wall of the face. Now the drillers, with these projectors, align themselves on the picture and drill through the rocks with the necessary precision. This original method permits the miners to greatly speed up assimilation of this new type of drilling, thus increasing their output of rock. [By E. Matskevich, IZVESTIYA correspondent] [Text] [Moscow IZVESTIYA in Russian 11 Mar 85 p 2] 12659

NEW DONETSK COAL HORIZON--Donetsk (TASS)--One of the oldest mining enterprises in the Donbass--the imeni Kalinin Mine in Gorlovka--has come onto an important reserve. Yesterday, a new working horizon, which now replaces worked-out faces, gave up its first coal. Comprehensive mechanization is a modern mining technique which is characterized by the putting into operation of an underground "shop". The useful life of this veteran mine, which has seen almost a century of service, is to be extended by ten more years. And by increasing labor productivity, fuel mined here will become cheaper. Since the beginning of the five-year plan, about 240 new working horizons have gone into production in the mines of the Ukraine--20 more than called for by the plan. [Text] [Moscow TRUD in Russian 9 Apr 85 p 1] 12659

**NEW THIN-SEAM COMPLEX DEVELOPED--Donetsk**--The horizons being worked by miners are occurring at ever greater depths and seams less than a meter thick are being encountered more often. Until very recently there was a lack of efficient comprehensive mechanization equipment suitable for such thin seams. The KD-80 complex, which is part of a new generation of mining equipment, is capable of mining coal in the thin seams which occur in unstable wall rocks. The unit was developed by the Dongiprouglemash [Donetsk State Institute for the Planning of Coal-Mining Machinery] with the assistance of specialists from Donavtomatgornmash [Donetsk Automatic Mining Machinery Association], and was manufactured by Donetsk and Ryazan oblast machinery builders. Trials of the unit were recently completed at the Ternovskaya Mine. The heaving soil, hard coal and a constant inflow of water--no one could have invented worse conditions. And so at this 170-meter-long longwall, the complex mined 700-900 tons of coal per day. The maximum amount mined in a single day came to 1,370 t. USSR Minugleprom [Ministry of the Coal Industry] has adopted a resolution to initiate series production of the KD-80 complex. A group of experts from the member countries of the SEV [Council for Mutual Economic Assistance] gave high marks to the KD-80, on the basis of which marks it has been decided to develop an automated complex for the coal industry of socialist countries. [By A. Malyy, EKONOMICHESKAYA GAZETA correspondent] [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 18, May 85 p 17] 12639

**MULTIKILOMETER CONVEYOR GALLERY DEVELOPED--Staryevo**--For the first time in our country, construction has begun on a 15-km-long enclosed conveyor gallery. It is being built as part of the KATEK [Kansk-Achinsk Fuel-Energy Complex] near the high-capacity Bereznovskiy-1 open pit coal mine by collectives of the Krasnovarstsvostroykonstruktivs [Krasnoyarsk Steel Construction] Trust, and installers from Belgorod, Volgograd and Novosibirsk. The one-of-a-kind structure is needed to deliver up to 100,000 t of fuel every day, in the cold and the rain, from the open-pit mine to the Bereznovskaya GRES-1 [State Regional Electric Power Station], now under construction. This unprecedented conveyor is being assembled by the installers by the industrial flow-type production method. The structures delivered from the plants to a special assembly area are being put together in 30-meter-long blocks which weigh up to 50 tons, and are hauled to their places on a heavy-duty cart where they are placed onto the foundation by a pair of cranes. [By V. Saitnev, SOTSIALISTICHESKAYA INDUSTRIYA correspondent] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian] [Mar 85 p 2] 12639

**MECHANIZED COMPLEX BOOSTS OUTPUT--Donetsk**--A new piece of equipment, specially designed for the development of thin seams has made it possible to boost the output of miners in the Donetskugol' Association's Irtysh Ye. Abakumov Mine. The (K-113) mechanized complex, introduced two and one-half months ago, has enabled the collective of A. Stepanov's section to mine 100,000 t of coal ahead of their schedule. Labor productivity has increased 5-fold. Work has begun at high speed right from the start. With no manual labor expenditures, the average daily output of coal from seams of less than a meter's thickness has appraised 1,500 t, which corresponds to indicators achieved so far only at longwalls with thick deposits. According to the technical re-equipment plan the Donbass miners should be setting 30 efficient mechanized complexes prior to the end of the year. [Text] [Moscow SEL'SKAYA ZhIZN' in Russian 2 Apr 85 p 1] 12639

**KEMEROVOGOL' ASSOCIATION LAGGARDS CITED**--The Kemerovogol' Production Association system consists of 20 open-pit mines. But when the talk turns to the best collectives, the miners from the Osinnikovskiy and Krasnogorskiy open-pit mines are usually named. The skillful manner in which they carry out mining operations, their efficient organization of labor and their rational utilization of the preparatory and mining equipment always make it possible for them to ship above-plan coal. This cannot be said of the debtors: the Chernigovskiy, the Mikhovskiy, the Kol'mogorovskiy No. I, the Krugobr'dskiy, the Prokup'yevskiy and other open pit mines have not coped with their plans for quite some time. There is but a single reason for this--the association, the general director of which is L. Rennikov, does very little training work, and reserves of coal prepared for extraction are always being reduced. It has gotten to the point where three weeks out of every month are given over to preparation of the work front by the mining collectives, who spend a week hauling out whatever coal has accumulated. In spite of the fact that decisive measures are now being taken to introduce new separities in order to make up for what has transpired, the debt incurred by the Kemerovogol' coal miners this year has exceeded 1.4 million r. of fuel. The problem of the drivers' completing their production sets is finding slow solution within the association, and the miners are experiencing a shortage of reliable highly-productive equipment. For example, they have grievances toward the machine builders from the Chelyabinsk Industrial Tractor Plant. The equipment bearing the Chelyash trademark is distinguished by its unreliability; of 118 bulldozers, no more than 60 have gone on line. These machines have also disappointed workers in other parts of the country. [Text] **NEVSEKRETA SOTSYRIZA INDUSTRII** in Russian 17 May 85 p 31 12639

**ENJOYMENT PLAN PERSONNEL LAUNCHED**--Shakty--The reformation and the accelerated work rhythm can be felt on the railroad sidings of the Central Enrichment Mill located in Shakty, which is part of the Kurskogol' Association. These days, the mill's collective has reported that they are ahead of the plan for the 11th Five-Year Plan period. They have produced 16,714,000 t of coked-mill coal and over 8 million tons of coal concentrate for the national economy. It is worthy of note that the production rate for every ton of coal has undergone an additional reduction of almost 8 percent since the beginning of the five-year plan period. The labor productivity for the mill workers increased 2.5-fold during this period. [By N. Zubchenko] [Encrypted] **NEVSEKRETA SOTSYRIZA INDUSTRII** in Russian 21 May 85 p 11 12639

CNN: 1622/271

NUCLEAR POWER

PARTY OFFICIAL DESCRIBES ZAPOROZHEYE AES; ZKES PLANS

Moscow GOLDS RICINT in Russian No. 9, Feb 81 p 5

[Interview with Mikhail Nikitayevich Vsevolodovskiy, CPSU Central Committee party member, first secretary of the Zaporozye Ukrainian Communist Party obkom and USSR Supreme Soviet delegate by V. Bodolashchikov and S. Troyan: "Zaporozhye's Energy (Interview with GOLDS RICINT)"]

[Excerpt] In Zaporozye at the end of last year there occurred a remarkable event: the nuclear power station's first block produced its first industrial kilowatts of electric power. Mikhail Nikitayevich Vsevolodovskiy, CPSU Central Committee party member, first secretary of the Zaporozye Ukrainian Communist Party obkom and USSR Supreme Soviet delegate talked about Zaporozye's noteworthy labor traditions.

[Question] Mikhail Nikitayevich, the industrial start-up of the Zaporozye Nuclear Power Station's first block and its first kilowatts are presently not just the biggest news in the oblast, but are remarkable events for the entire industry as well. This was a long-awaited moment. Tell us, how we got to this moment, and who hastened it?

[Answer] Our present success is the result of almost five years of work of a collective of many thousands of construction and installation workers. I want to make special mention of the fact that, just as in its time the construction of the Dneproges (Dnipro River Hydroelectric Power Station) served as the standard for SES (Hydroelectric Power Station) construction, so today the Zaporozye AES (Nuclear Power Station) has become the main experimental and demonstrative construction project in the series sharing in mind the Belogorskiy, Rostovskiy, Kurskskiy and Novosibirskiy nuclear power stations, all of which were erected according to a standardized plan.

[Question] Why an experimental and demonstrative project?

[Answer] Because for the first time, and on previously this construction site, a time-line construction method for building these stations is being worked out, which will reduce the labor intensiveness and the time needed for installation.

I don't like the word "record" very much in regard to labor, however in this case it suggests itself. Judge for yourselves: the first cubic meter of concrete was poured into the foundation of the first power block reactor only in April 1980; at the same time, that December, the large-panel house-building plant began operation: and so, nine months later, did the non-standardized equipment and piping plant. And now the station has produced its first industrial current.

With the start-up of this AES, our kray becomes--and can't think of another word--"unique" from the standpoint of electric power production. And how is this expressed? Along with the Dneproges, a powerful GRES [State Regional Electric Power Station] has been operating for several years, and now we're adding a nuclear power station to it. With its being put on stream at full capacity, all the oblast's power stations will produce over 40 billion KW/hours of electric power per year. This, by the way, is more power than was produced by all the stations in the country before the war.

The first block is only the beginning. There are plans at present, in 1985, to put the second million-KW reactor into operation, and four more in the next four years. A true power-production corridor.

[Question] Mikhail Nikolayevich, what is the state of affairs today at the legendary Dneproges?

[Answer] A nuclear power station is a nuclear power station, but we're not forgetting the Dneproges either. The station is slated for a radical renovation during the upcoming five-year plan period, and this will increase its capacity by almost one third. I'll tell you a little secret. It is the dream of the Zaporozhye power engineers to build a GAES, a hydroelectric pumped storage power station, alongside the Dnepr River Hydroelectric Power Station. It goes without saying that these are only isolated brush-strokes, if I may say so, on the big power-production picture for the kray. However, I believe these strokes are convincing. I will add one more fact peculiar to this situation. You very likely won't find, in the land of power stations, and no matter where they have worked, specialists who are not in some way connected with Dneprostroy [Dnepr River State Construction Project], the Dnepr River Hydroelectric Power Station or our thermal electric power stations and nuclear power stations. Some of them have been planning, some building and a third have come here for experience.

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CSO: 1822/245

NUCLEAR POWER

### SUPPLY DELAYS PLAGUE KURSKAYA AES

Moscow KOMSOMOLSKAYA PRAVDA in Russian 15 Mar 85 p 2

[Article by V. Varnakov, Brigade Leader, Delegate to 19th Congress of All-Union Lenin Young Communist League, Kursk Oblast: "More Energetically, Atomic Power"]

[Text] The young builders of the world's largest atomic energy station has taken the decisions of the Special Plenum of the CC CPSU as a matter of vital, personal interest.

One morning not long ago on my way to work I met some of the gang--workers of the atomic energy station.

"You know," they told me, "yesterday after the plant start-up 100 billion kilowatt-hours of electric energy were generated."

I too congratulated my friends upon this routine success. And then all the way in I tried to imagine that figure with all the zeros at the end. It was difficult. Just like counting the stars in the sky. And then I recalled the train loads of iron ore mined with the help of that energy at the KMA quarries, and the gigantic electrometallurgical combine in Stary Oskol, which received high-voltage lines from Kurchatov, and the unimaginable billions of kilowatt-hours immediately became significant and visible. And most of all was the joy that we too had contributed to that success, we, the builders of the world's largest atomic power station.

...Despite the early hour, the site sparkles with the light of electric welding. Work continues day and night. Indeed, having revised our original commitments, we had decided to activate a fourth energy block this year, a month ahead of the original timetable. Is this realistic? The construction schedule of a unit as complex as an atomic energy block is formulated literally by the day. And yet I believe that the young builders of the All-Union Komsomol Shock Work Construction [Team] are completely up to it.

The task set is a very serious one. What can we, the construction crew of this very large atomic power station, do to help make it a reality? What kind of construction can we make today to accelerate scientific and technological progress, to increase labor productivity? Unlike the first

energy blocks, the new ones are built with consolidated reinforced panels. They are assembled on the ground and brought in already finished form to the construction site. A mobile conveyor, referred to on site as the "Kursk moon-walker", hauls the multiton circuits of the atomic reactor to the block.

But I would like to say something else about this. Around two years ago in KOMSOMOLSKAYA PRAVDA I wrote about the problems preventing us from activating the station's third energy block on schedule. Unfortunately, these problems persist. Numerous supplier organizations spread out among many ministries and agencies, are really letting us down. Planned schedules for deliveries of equipment and materiel are often not observed, and sometimes what comes to the construction platform is frankly defective.

In the documents of CPSU Central Committee Plenum emphasis was placed on the need to broaden rights, to increase autonomy and the accountability of the organizations, to strengthen their interest in the end result of the job. Accountability--apparently not everyone realizes that broadening rights is impossible without increasing accountability. The USSR Ministry of Energy should probably give some thought as to what should be done to make sure that every enterprise with whom we are contractually bound has an incentive to complete the project in question without fail. Local Komsomol committees might help here. It would not hurt, as once was the case, for the Komsomol representatives in Kurchatov to hold a meeting. In the critical pre-operational phase the site is in great need of reinforcing a business-like approach. And we, the builders of the Kurskaya AES, for our part, will do our all to bring another million-block into our country's energy system this year as promised. This will be our tangible response to the decision of the party, and a nice present for the upcoming CPSU Congress.

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NUCLEAR POWER

BRIEFS

**NUCLEAR HEATING STATIONS PLANNED**--In compliance with the plan, electric power production for 1985 should come to 1.540 billion KW/hours against the 1.294 billion produced in 1980. The development of large-scale highly-efficient nuclear power production has taken on particularly great significance. The year 1985 will see capacities of a million KW each being put on stream at the Kurskaya, Smolenskaya, Balakovskaya and Zaporozhskaya AES's, a scale-model of which is shown in the lower picture [picture not shown]. A radically new direction in central heating supply is developing: construction of nuclear heat supply plants, nuclear central heating and power plants and nuclear industrial heat supply plants, as well as construction of TETs-ZITT's [Heat and Electric Power Stations-Solid Fuel Plant Manufacturing, which have been developed by VNIPPIEnergoprom [All-Union Scientific Research and Planning Institute of the Power Engineering Industry] (upper picture) [picture not shown]. [Excerpt] [Moscow EKONOMICHESKAYA GAZETA in Russian No 21, May 85 p 1] 12659

**BALAKOVSKAYA AES'S MILLION-KW BLOCK**--The first million-KW power block has been prepared for start-up at the Balakovskaya AES. The piping for the main circulation loop has been welded, the system has been flushed and other critical operations have been carried out by installers working under extremely compressed deadlines. In the days ahead, an AES collective will initiate pre-startup operations: a hot breaking-in run of the reactor systems, a test of the thermal jacket as well as other operations. [Excerpt] [Moscow EKONOMICHESKAYA GAZETA in Russian No 21, May 85] 12659

**YUZHNO-UKRAINSKAYA FIRST PHASE COMPLETED**--UkSSR (TASS)--With the putting into operation of the second power block, construction of the first phase of the Yuzhno-Ukrainskaya Nuclear Power Station is complete. There are at present already two million-KW generating units operating in the European USSR's Unified Power System. [Excerpt] [Moscow EKONOMICHESKAYA GAZETA in Russian No 21, May 85 p 2] 12659

**SOTSIALISTICHESKAYA INDUSTRIYA REVIEWS SUCCESSES**--No 20 (332) "SOTSIALISTICHESKAYA INDUSTRIYA" 'On Atomic Machine Building' opens with reports on the progress of the competition in pre-deadline completion of the last year of the five-year plan period. "Consolidate the Successes Achieved on the Labor Shift in Honor of the 40th Anniversary of Victory in the Great Patriotic War"--is the slogan under which leading collectives of construction and operational workers are laboring these days. In a single week, S. Rudakov's brigade pro-

duced R5,000 of above-the-plan output at their concrete-mix plant. A. Shapovalov's brigade at Otdelstroy have produced up to 1.5 times their quota. Subdivisions of the Volgodonskenergostroy [Volgodonsk Power Construction Trust] have accumulated over R34 million worth of above-norm reserves of construction materials, structures and equipment in depots and warehouses. How are efforts to reduce this quantity of trade goods valuables going? V. Navozov's letter, "Why there Is a Surplus", published in the issue, answers this question. The newspaper set T. Makarova's article under the heading "The Understudy Didn't Let Us Down". The article tells of the plant workers' great success: there is one more type of Atom mash product, i.e. heat exchangers. A. Zornin's letter, "Responsibility...in Short Supply", the conclusion to Sergey Sado-shenko's story, "The Zero Cycle", replies to the paper's critical addresses, and the letter to Kuz'ma Volgodonskiy, "In Expectation of the Fire" were also published in the issue. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 16 May 85 p 2] 12659

CONSTRUCTION SLATED--Ekibastuz-- The scientists' idea for in situ conversion of the energy of Ekibastuz coal into electric power is being realized. There are plans for the construction of a series of power stations having a total capacity of 20 million KW. The 2nd GRES [State Regional Electric Power Station] is already under construction here. [By L. Aleynik] [Excerpt] [Moscow IZVESTIYA in Russian 23 May 85 p 2] 12659

SMOLENSK AES INCREASES CAPACITIES--On 29 May the State Commission accepted as operational the 2nd power block facilities of the Smolensk AES, with an evaluation of "excellent". "We are going to use the flow-line production method to build the second and third phase blocks using a single standardized plan. We are faced with a complex task. To solve it, we need to expand our production base, introduce a variable schedule within the subdivisions, and make wide use of the integral process brigade contract. [Excerpts] [Moscow TRUD in Russian 31 May 85 p 2] 12659

BILIBINO AES SAFETY--Bilibino (Magadan Oblast)--The nation's northernmost AES bears the name of the newspaper KOMSOMOLSKAYA PRAVDA. The station generously and uninterruptedly provides heat both to the town and the industrial enterprises of the region. In January 1984 the AES celebrated a minor anniversary--the tenth anniversary of the on-lining of the first block. And within this period there has not been a single accident or serious breakdown. The station is literally the town's trademark. Its attractive, stylish building is visible even from the far approaches to Bilibino. And the outside is not deceiving: it is just as clean and inviting on the inside. The entire staff--from director Sergey Petrovich Mefodiyev to the maintenance worker--are clad in work garments and white caps. The AES is equipped with state-of-the-art technology. And to whomever we spoke at the station, all unanimously agreed: it's a nice place to work. [By N. Dolgopolov and D. Yakushkin] [Text] [Moscow KOMSOMOLSKAYA PRAVDA in Russian 21 May 85 p 2] 12912

**BILIBINO AES DESCRIBED--Chukotka Autonomous Okrug--**The Bilibino AES today is a large enterprise, where highly qualified specialists toil. It is also at the same time a giant laboratory for "refining" new energy theories in the extreme northern climates. The station's design and layout of facilities are very compact: all equipment is situated in one part of the complex, which significantly facilitates servicing during the protracted and severe polar winter. For the entire period of energy utilization at the station the work has gone smoothly, with the plan for electric and thermal generation unalterably met. Over the years the capacities of the initial blocks and repairs to the energy-generating equipment have been perfected and dozens of innovations made. The economic effect of the new technologies has amounted to 650,000 rubles since the start of the 5-year plan, and through rationalization measures, more than 1 million rubles. The Bilibino "atom plant" has one of the highest ratios of standard capacity utilization. It reached 80 percent in 1983. For a 10-year period the AES displayed an entire range of advantages. The production cost of electric and thermal energy here is significantly lower than in thermal plants located in the region. On-lining of a nuclear energy source has permitted savings of more than 1,500,000 tons of organic fuel. It has not been necessary to engage a large number of vessels for fuel delivery. The electric station has provided not only electric, but thermal energy as well, and hot and cold water. The economic and social ramifications of all of this are difficult to overestimate. With the start-up of the atomic plant's main thermal networks 28 boiler rooms were closed and dozens of people freed from hard physical labor. [By A.V. Klimenko and B.I. Kiselev] [Text] [Moscow ENERGETIK in Russian No 3, Mar 85 pp 21-22] [COPYRIGHT: Energoatomizdat, "Energetik", 1985] 12912

CSO: 1822/237

## ENGINEERS PRAISE INCREASED EFFICIENCY AT LUKOMLSKAYA GRES

[Editorial Report] Moscow ENERGETIK in Russian No 6, June 1985 carries on pages 1-2 a report praising the performance of the 2400 MW Lukomlskaya GRES. The authors, an engineer and a candidate of technical sciences, list a number of technical problems "which had determined to a significant degree the working reliability of the equipment" and have now been resolved. The following indicators are given as evidence of the successful work on the equipment and methods of exploitation, assembly and repair:

Indicator/year	1976-80	1981	1982	1983	1984
<b>Availability factor, %</b>					
planned	83.45	86.3	85.9	85.78	84.42
actual	88.1	91.08	90.87	89.5	89.62
<b>Operating power, MW</b>					
planned	1890	1947.1	1933.8	2122.6	2147.02
actual	2072	2105.2	2098.11	2160.4	2182.4
<b>Reduction of duration of planned repairs, h.</b>	---	93	110	110	191

In addition to the daily equipment inspections and labor incentives which helped achieve these results, the authors state that "an increase in the production supply of power equipment is one of the basic technical undertakings which has helped increase the working capacity of the station." The authors believe that it is realistic to presume that the 300 MW power units can increase their nominal capacity by 10-15 percent in 1985, or up to 330-345 MW. Currently, an analysis of each start-up and shutdown of the power-units is being conducted with the intention of increasing the efficiency of these operations.

PIPELINE CONSTRUCTION

1985 CONSTRUCTION TASKS

Moscow STROITELSTVO TRUBOPROVODOV in Russian No 1, Jan 85 pp 2-5

[Article by V.G. Chirskov: "Entering the Final Year of the Five-Year Plan"]

[Excerpts] ... In an unprecedented period of time, a gas pipeline complex without parallel on earth, involving hundreds of compressor stations, has been built with a capacity of some 200 billion cubic meters of "blue fuel" annually and a total length exceeding 20,000 km, which is half-way around the world at the equator. Total booster station capacity approaches 15 million kW, over three times the capacity of the huge Bratskaya Hydroelectric Power Plant in Siberia. The largest and most important line in the six-line system is the Urengoy-Pomary-Uzhgorod Export Gas Pipeline, which is 4,451 km long. This pipeline moves 32 billion cubic meters of gas a year to the cities and businesses of the Soviet Union and abroad to both socialist and capitalist countries....

In 1984, the total volume of construction and assembly contracts reached 6.5 million rubles for the first time, 44 percent above the last year of the last five-year plan, the 10th. The figures were 3.35 billion rubles and 60 percent, respectively, for western Siberia. Industrial enterprises in this sector succeeded in fulfilling the plan: in four years, commodity production increased 31 percent.

Huge special-purpose tasks were solved. The fifth line of the gas pipeline system, Urengoy-Tsentr-1, from Urengoy to the center of the country, was placed on stream in June of 1984, ahead of time instead of in the fourth quarter. A huge job was done in a short time, making it possible to produce and deliver condensate from the Urengoy Field. A complex at the new Karachaganak Gas Condensate Field, designed to handle three billion cubic meters of gas and two million metric tons of condensate, was placed in service a year ahead of plan. The first oil production facility in the Caspian Depression began operations: the Zhanazhol'skiy Field, where a complex with a capacity of a million metric tons of oil, including desulfurizing and gas dehydrating equipment, was built and placed in trial service. By October of last year, all units at the complex were in operation and the first batch of elemental sulfur was produced. Gas treatment plants with rational utilization of all by-products, with a capacity of 21 billion cubic meters of gas annually, were placed in service in Turkmenia and Uzbekistan.

Feeder pipelines to electric power plants were finished ahead of schedule, releasing some eight million metric tons of fuel oil.

The ministry also accomplished agricultural tasks well. The Fourth Bashkirskiy Sugar Plant, with a capacity of 30,000 hundredweight of beets a day, turned out its first sugar on the eve of the 67th Great October Revolution Anniversary. Facilities producing industrial silica gel were also placed in service.

Considerable progress was made in the construction of living quarters and social, cultural and retail facilities.

Over the past year, efforts continued toward the scientific and technical development of the sector, and plans for implementing new technology were met.

During the year, some 300 measures with a total national economic impact of 385 million rubles were placed in effect. Work continued on 19 tasks on the national economic plan and 12 government scientific and technical projects. A number of high-efficiency construction innovations were implemented on both surface facilities and pipelines. The value of prefab construction was over a billion rubles. Continuing improvement in the automation and mechanization of assembly welding remained a basic trend in the area of developing welding techniques and technology.

Over the last year, construction mechanization improved and the ministry supplied more construction equipment and energy resources to its various agencies. Some 25 working designs of experimental models of various machines and devices were developed, and 10 experimental prototypes were manufactured.

The number of workers employed in construction increased no more than five percent in the first four years of the five-year plan, but the volume of construction and assembly work increased by nearly half. This convincingly shows once again that the sector's technical and economic achievements are solely due to increased labor productivity and more efficient production. The trend toward reduced personnel turnover has already been mentioned. The fact that the average age of the sector's employees is 34 (32 in western Siberia) is gratifying. Some 13,000 Komsomol youth are hired annually in the ministry's various departments.

Even a brief survey of the sector's activities during the first four years of the 11th Five-Year Plan or of the past year brings one to a simple conclusion: the sector's workers have accomplished much. However, a review of results reveals that in the operations of the ministry and its enterprises and other organizations, there are a number of unutilized reserves. Several oil pipelines, branch gas pipelines and feeder lines to cities and industrial enterprises have not been placed in service. In the overall performance of planned projects, the ministry did not perform oil industry tasks, so that portion of the plan was not met.

Measures to improve labor organization and transportation, implement technology and adopt economic guidelines are being implemented slowly.

Disciplined resolve and control and checking procedures, in spite of certain successes achieved in this sector of operations, still do not fully measure up to current requirements.

Over 30 percent of industrial enterprises and 40 percent of construction organizations failed to meet profit goals. In evaluating the sector's achievements in promoting scientific and technical progress, it can be said that much has been done in this area. However, the work done toward improving technical construction standards and quality still does not fully meet the tasks assigned to the ministry. Structural improvements of the ministry's agencies involved in pipeline construction and the development and implementation of technically proven low-level planning aimed at delivering high final labor results are moving slowly.

In spite of the fact that the sector is making a special effort to put the Foodstuffs Program into practice, not all divisions are giving proper attention to this important task. For all practical purposes, subsidiaries of Glavneftegazmontazh, Glavvostoktruboprovodstroy, Glavsredazneftegazstroy and the Soyuzneftegazstroykonstruktsiya, Soyuzpodvodtruboprovodstroy and Soyuzintergazstroy associations have not been set up or developed.

It is imperative to analyze 1984 production and economic performance thoroughly and evaluate each and every brigade, department, construction administration, trust and central board by work quality improvement....

The 1985 plan is complicated by the fact that pipeline operations declines by 350 million rubles and the construction of surface facilities increases. Over 16,000 km of pipelines, 52 pumping and compressor stations and 2.5 billion cubic meters of gas refining capacity are to be built this year. Work will continue on trunk lines moving gas from areas in western Siberia to the European part of the country. The Urengoy-Tsentr-II gas pipeline is slated for completion in early 1985 instead of in the second quarter.

As before, success in fulfilling the plan will depend on how the sector's work in the North progresses during the first quarter and how it will manage to organize short winter shifts and still perform 27 to 32 percent of the year's work....

Six large-diameter trunk gas pipelines are to be laid from both the Yamburg and the Urengoy fields to the center of the country. Work on two of the pipelines will have to be extended into next year.

Further expansion of the branch pipeline system is planned in 1985, including feeder lines to electric power plants, TETs and industrial plants.

Construction operations at the Urengoy, Yamburg, Astrakhan and Karachaganak gas condensate fields will increase.

The underground gas storage system will be expanded.

In the oil industry, the entire length of the Kholmgory-Klin and Saratov-Kuz'michi oil pipelines will be placed in service, and a series of measures for increasing the throughput and reliability of operating oil pipelines will be implemented.

A considerable increase in oilfield construction is planned in the Tyumen' Oblast'. In one year, 15 new fields must be brought on stream and additional gathering and refining capacity for petroleum gas must be built. In a short time frame, operations must be developed at new fields in western Kazakhstan.

A series of pipelines will be laid to deliver petroleum products to the national economy.

Some two million square meters of general living quarters, general-instruction classrooms for 22,500 students and day-care facilities for 13,500 pre-schoolers and other buildings must be built.

A number of projects are planned for other sectors of the national economy, in which construction for the Foodstuffs Program occupies a prominent position.

A number of facilities for light industry must be built. Plans call for opening facilities producing non-woven materials in Tuymazy, the Almet'evskaya Hosiery Factory, a swine complex in Tyumen' Oblast', etc.

Completion of the pipe portion of the 250-km Belogo-Novosibirsk experimental coal slurry pipeline is planned.

Subdivisions of the Ministry of Construction of Oil and Gas Enterprises will continue foreign construction projects.

Redoubled emphasis on its own industrial base is imperative in 1985. Delayed construction of a number of projects cannot be tolerated.

Over 60 percent of capital investment in the construction of enterprises is flowing to western Siberia, and these investments must be implemented, because a number of extraordinarily complicated tasks in this region must be accomplished in the 12th Five-Year Plan.

Some 668,000 square meters of total living quarters must be built for the sector's own construction workers, including 430,000 square meters in western Siberia.

Compared to 1984, the industry is slated to increase standard net output by 10.3 percent and sales production by 4.3 percent. Machine production output for the sector is planned to increase by 7.5 percent.

Basic trends in the operations of the sector's industrial enterprises in 1985 are as follows. The foremost emphasis is on the development and organization of the production of modern industrial designs, materials and special mechanized pipeline construction equipment delivering high-quality technical perform-

ance in the construction of trunk and field pipelines. Further development and technical improvement of marshy-terrain equipment and the ETR254 wheel excavator and its modifications are planned, as well as increasing the output of welding equipment and control devices and the reliability of construction equipment. Two hydraulic stamping lines producing small tees are slated to be placed in operation and the output of quick-assembly units up to 24 m in size will be increased and used in the construction of prefab buildings. A switch-over to the production of new workers' quarters will be implemented to provide more comfortable living conditions for construction personnel.

Further development of the production of domestic and other consumer goods is planned, with annual output to increase by a factor of 1.8.

This year's efforts of the sector's specialists and scientists must be directed toward the development of technological processes and engineering means supporting year-round construction of trunk pipelines in marshy areas and permafrost, the devising of control systems, organization and the technology for constructing large-diameter gas pipelines with working pressures as high as 10 MPa, raising standards for the industrialization of construction, mechanizing, automating and robotizing technological processes, guaranteeing high-quality construction and assembly work and reliable trunk pipelines, developing and introducing slurry pipelines and meeting social programs.

In order to solve the complex scientific and technical problems inherent in the development of large oil and gas pipeline systems under conditions prevailing in western Siberia and the Far North, it is imperative to attract the potential of pure basic science more extensively. Institutes of the USSR Academy of Sciences and the union republics and ministerial organizations are continuing research in the problems of strength and reliability of trunk pipelines, automated methods, pipe-joint welding and inspection equipment, development of new insulation materials, improving the wearability of working components of construction machinery and apparatus and pumping solids through slurry pipelines.

The value of all pre-assembled construction in 1985 will reach 3.707 billion rubles. The ministry will accomplish 59 percent of total construction using its own resources. The main trend in pre-assembled construction is the prefab method of organizing the construction of surface field facilities. It is imperative once and for all to upgrade capabilities of the combines building living quarters and then to expand construction of pre-cast large-panel living quarters and social and cultural facilities.

The expedition-watch method of oil and gas field construction should be used more. The time has come for some foremen to change their attitude toward this modern construction method.

In order to solve complex tasks in 1985 and future years, the ministry continues improving construction organization and administration. Over the past year, central administrative boards were set up in Yamburg, Kazakhstan, Turkmenia, Bashkiria and Moscow. These central boards must be staffed with highly qualified personnel without delay.

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PIPELINE CONSTRUCTION

UDC 621.643.002.2(571.1)

PIPELINE-ERECTING UNIT TELLS OF PAST SUCCESSES, FUTURE MOVES

Moscow STROITELSTVO TRUBOPROVODOV in Russian No 1, Jan 85 pp 14-15

[Article by P. P. Shabanov (Glavsbtribuboprovodstroy, Tyumen): "High-Speed Methods for Erecting Pipeline Systems from West Siberia"]

[Text] The formation in West Siberia of the country's main base for recovering oil and gas has led to a shift of the main pipeline-construction targets to this region. In the 11 years of its existence, Glavsbtribuboprovodstroy [Main Administration for Pipeline Construction in Siberia] has built in West Siberia more than 18,000 km of pipelines and 60 compressor stations and it has assimilated more than 6 billion rubles.

In implementing the party's decisions about the further development of the country's fuel and power complex in West Siberia, Glavsbtribuboprovodstroy subunits have been successfully carrying out 11th Five-Year Plan tasks for the construction of high-capacity pipeline systems. The main administration's goals for the first 4 years of the five-year plan were met ahead of time--on 24 September 1984. During this period 3.901 billion rubles of capital investment were assimilated, 3,607 km of pipeline and 23 compressor stations were put into operation, 162,900 m<sup>2</sup> of housing and other facilities were put into use. Socialist commitments for an above-plan increase in labor productivity and decrease in prime construction costs are being realized successfully. More than 1.52 billion rubles' worth of the work was done by the brigade-contract method.

The special natural and climatic conditions in the area of construction, where 50 percent of the pipelines are being laid in sections difficult of passage, the severe winter, the great length of the routes and their remoteness from bases and housing create additional difficulties in conquering West Siberia's gas and oil fields and influence the nature of the construction work.

The well-known engineering methods and organizational forms for work that are used in the central belt and in the Urals or Central Asia have proved to be completely unsuitable in regions of Tyumen's North. In the 15 years that have elapsed since start of erection of the first large gas and oil arterials from West Siberia, the builders have acquired great experience, their potential has grown qualitatively, and they are confidently developing Siberia's oil and gas treasures.

When the main administration was created, this task was assigned--to work out and introduce basically new forms of management and work organization that

would enable the pace of pipeline construction, of both the line portion and the compressor and pump stations, to be increased considerably.

The introduction of high-speed flow-line construction with the use of large complexes started in Glavsbtruboprovodstroy in the 1973/1974 season, during construction of the Nizhnevartovsk GPZ [Gas Treatment Plant]-Surgutskaya GRES gas pipeline. Two-shift work on the main production operations--delivery, welding, insulating and ditch ripping--was organized with precision for the first time at this construction project.

During the 1974-1975 season, two high-speed columns were already at work. They welded by the high-speed flow-line method, using cellulose-coated electrodes and consolidated welding brigades, which permitted the welding pace to reach the insulating pace. The columns were established on the basis of the welding and assembling administrations, to which insulating and pipelaying subunits had been transferred, and, during the construction period, sections for specialized operations (ditch ripping and the delivery of pipe and weights) were attached. The complex of basic operations was carried out by a column of up to 300 men. Thanks to the use of this management structure, average season productivity rose from 47 to 115 km.

The consolidation of welding and assembling brigades enabled manpower to be cut. While in 1974 the main administration had 80 welding and assembling brigades in which 465 welders worked, in 1984 there were 960 welders working in the main administration's 31 brigades.

Two-shift work, with payment made under a single job order, began to be introduced with brigade consolidation. This innovation enabled the brigades' pecuniary interest in the final results of their work to be raised, machinery, mechanisms and equipment to be used more efficiently and rationally, and the average seasonal output by type of work to be raised.

In the 1979-1980 season, earthmoving brigades were formed for the first time. Collective forms for organizing the operators' work enabled output per machine to be raised and more progressive forms of pay to be instituted.

The forming of brigades in all areas of work enabled the introduction of cost-accounting at low levels. However, introduction of this progressive method of payment was complicated by the fact that certain specialized brigades were subordinated to other administrations and received their pay there. This required the creation of integrated-operations flow-line groups capable of independently conducting the full set of basic operations.

Glavsbtruboprovodstroy created, for the first time in the industry, integrated trusts for pipeline construction and a specialized trust for erecting compressor stations. Specialization at the trust level permitted the number of organizations engaged in pipeline erection to be cut, responsiveness in the solution of engineering and organizational questions to be increased, the provisioning of supplies and equipment to be improved, and control organs to be brought closer to the construction projects.

Beginning in 1982 multiple-strand systems of gas pipelines from West Siberia were erected in a single corridor of operations. This enabled the boundaries for trusts, flow-line groups and brigades to be stable throughout the whole

construction period, enabling optimal siting of the base's housing settlements, pipe-welding bases, and capacity for manufacturing reinforced-concrete weights. The possibility of performing line operations simultaneously on several pipelines, depending upon the presence of the supply, equipment and human resources, and also on the characteristics of the section and the time that the work was carried out, appeared. The time spent on resiting the operating bases was sharply reduced.

The main administration's subunits paid major attention to assembling ahead of time components for switching on the compressor stations, shore pipe arrays and line cocks. Specialized administrations for engineering-technology operations were created for this purpose in each trust.

A large amount of the line work was done by the main administration in the summer period. While 62 km of pipeline in all were constructed in the summer in 1981, 118 were erected in 1983, 200 in 1984.

The main administration is performing a large-scale experiment on round-the-year construction. The first stage of this measure calls for exact engineering preparation and the introduction of advanced engineering solutions for all types of operations, using existing construction equipment. For the first time trusts were given the mission of constructing round-the-year rights of way. In order to build roads, nonfabric synthetic materials, thermosiphons and felling slashes were used widely.

Planning organs can also exert a great influence on the annual work volume performed by flow-line groups if they do not plan introduction of a facility for the first quarter--the period most favorable for doing line work.

The main administration is devoting major attention to providing subunits with reinforced-concrete weights and AR-401 open-work anchors. In 1981 the trusts' main forces manufactured 16,000 sets of weights, 44,000 in 1983 and 58,000 in 1984.

The main administration's program for reequipping calls for the construction of mobile enterprises for manufacturing reinforced-concrete weights in Uren-goy, Nadym, Belyy Yar, Andre and Komsomolsk with a productivity of 35,000-40,000 m<sup>3</sup> of reinforced concrete per year. However, realization of this program is being hampered by a lack of financing for three of the enterprises.

At the metal-structure plant in Tyumen, UM-14 manufactures each year more than 5,000 AR-401 anchors; they replace more than 40,000 reinforced-concrete weights. Orgtekhnroboprovodstroy [State Trust for the Industrialization of Pipeline Construction] has now developed and is mastering new technology for manufacturing anchors which, through the introduction of resistance welding of rods and the use of large-diameter scrap pipe for the manufacture of lobes, will allow the cost of anchors to be greatly reduced and will save an appreciable amount of metal.

Substantial qualitative and quantitative changes have occurred in the technical equipping of pipeline construction in the last decade. Thus, the available power per unit rose 1.8-fold, the number of mechanisms used per 100 workers engaged in construction and installing work increased 1.3-fold, and output per worker doubled.

Each year the main administration's subunits master tens of new models of construction machinery and equipment and progressive technology and ways of organizing the work. The successful introduction of new equipment comprises the basis for the accelerated development of pipeline construction and high economy of production.

For the first time in the industry, the main administration mastered the technology of welding pipelines by the flow-line group method and the organization of construction by high-speed columns, and it developed and introduced new, economical methods for securing pipelines at the designed grade level with anchors that can be fired and opened up and a method for installing weights with the use of nonwoven synthetic materials and soil. Jointly with the Kiev Branch of VNIIST, it has developed and mastered new structure for ice crossings and roads with the use of thermosiphons. The main administration has mastered the manufacture of eight-position AS-81 type welding units based on the K-700 tractor. Using the Sever installation for electrical resistance welding, the brigades of N. V. Minayev, V. A. Gavryuchenkov and B. P. Diduk are confident of meeting the 100-kilometer goal during the current winter season. Jointly with the Institute of Electrical Welding imeni Ye. O. Paton, the main administration continues work to increase the machines' reliability, and new machines for welding multiple-layer pipe that are capable of overcoming angles of turn are being created. Accelerated conversion to resistance welding will enable questions of raising the pace and quality of construction to be solved and weather effects to be excluded. The main administration's subunits have mastered the technology for building pipelines with mill-insulated pipe. Innovators have created a general-purpose installation and tooling for repairing damage, even of joint insulation. Practically all the new equipment that is arriving was tested for and adapted to Siberian conditions by Glavsbtruboprovodstroy workers and engineers.

The main administration is the co-executor of a number of major comprehensive programs at the GKNT [State Committee for Science and Technology] level. For the first time in world practice, a 300-km industrial-test section made of multiple-layer pipe designed for 10 MPa of pressure is being built. In addition to the pipe, new gas-pumping units and connecting parts will be tested for the first time at the section. Within a short time, during construction, the necessary for perforating the pipes was revealed, the geometry of the ends was refined, and the technology of cutting, cleaning and insulating was worked out. It is also necessary to work out an improved technology for the rotary welding of joints on stands, to refine the parameters of the new, serially produced equipment, and to discuss other engineering solutions. And even today, when the construction project has begun to gather speed, staffs of competent representatives of all the program's participants must be organized in order to solve problems competently and responsively.

Each year more than 800 innovators' suggestions are being introduced annually within the main administration's subunits, with a total economic benefit of more than 5 million rubles. Fifty creative brigades of innovators will introduce in their subunits more than a third of all the innovations.

An important and effective means for raising the pace and quality of construction and for cutting the time required for introduction into operation is socialist competition in which all trusts, flow-line groups and brigades participate. The results of the competition are brought to the collectives at

weekly teleconferences and are published in the main administration's socialist competition leaflet, "For Rapid Work and Quality." Placards, urgent flyers, information leaflets and other means of visual information regularly publicize competition progress.

The main administration has repeatedly taken prize places for introducing 11th Five-Year Plan jobs ahead of schedule. In the last construction season alone, main administration subunits placed 31 times, and 43 of its workers were awarded state prizes.

Severtruboprovodstroy [Northern Pipeline-Construction Trust] and the integrated flow-line operations groups of I. I. Nikiforov and P. A. Sozonnik of this trust, which laid altogether 123 and 150 km, respectively, of pipeline, achieved the best indicators for labor-productivity growth. The integrated flow-line operations group of A. G. Tsai from Komsomolsktruboprovodstroy [Komsomolsk Pipeline-Construction Trust] carried out ahead of schedule all operations on its 105-km section, and the flow-line group from Kazymtruboprovodstroy [Kazym Pipeline-Construction Trust], supervised by Yu. P. Bolshakov, completed the construction of a 117-km section.

Last season V. D. Madenov's insulating and laying column established an unusual record, having insulated 1,000 km of gas pipeline in 10 years of work in the Tyumen North. Sixteen integrated flow-line operations groups, nine of which exceeded the 100-km goal, worked in the main administration's subunits.

A high work pace cannot be provided without solid preparation and buildup of housing settlements. These questions are constantly the center of attention of the main administration's economic, party and trade-union organizations. Our subunits have organized 32 settlements along the route. Each year the main administration introduces more than 50,000 m<sup>2</sup> of permanent housing. Our settlements of Molodezhnyy, Priozerneyy and Khetta of Severotruboprovodstroy Trust, Yubileynyy settlement of Priobtruboprovodstroy [Ob Region Pipeline-Construction Trust], and Oktyabrskiy and Verkhniy Kazym of Kazymgazpromstroy [Kazym Trust for the Construction of Gas-Industry Facilities], which have full complexes of cultural and personal-services facilities, have repeatedly been recognized as the best in the industry. We pay special attention to training personnel and to raising worker qualifications. Training combines are operating in each trust, and at Tyumen a school of welders and a construction teknikum have begun to train specialists. Our workers' children play during the summer in pioneer camps at Gelendzhik, Zhdanov and Gagry. All this will enable personnel turnover to be reduced and stable collectives capable of performing specific tasks to be created.

The main strategic task of the main administration's organs during the 12th Five-Year Plan will be to build up the Yamburg field. That is why the main thing for Glavslibtruboprovodstroy collectives in 1985 should be the conduct of major engineering preparation, construction and expansion of the bases, the forming of new collectives, and mastery of improved machines and technology that are connected with excavating permafrost ground, thermal insulation of pipelines, and hydraulic soil fill.

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PIPELINE CONSTRUCTION

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DEVELOPMENT OF INDUSTRIAL CAPACITY IN SIBERIA

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[Article by S. G. Kaplan of VPO Soyuzneftegazstroykonstruktsiya [All-Union Association for the Production of Structure for the Construction of Oil and Gas Enterprises]): "Development of the Production of Industrialized Outfitting Items for the Accelerated Conquest of West Siberian Fields"]

[Text] An important task of industrial enterprises is to support maximum acceleration of the rate of increase in the production and delivery to builders of new outfitted structure and articles that are efficient, high in quality, inexpensive and fully readied at the factory, will meet the requirements of minimal expenditure of labor and materials at the construction site, and will withstand the natural and climatic conditions of the oil and gas bearing regions of West Siberia that are under development.

Much work on mastering the production of new, good-quality, highly industrialized constructional structure and articles has been done at Soyuzneftegazstroykonstruktsiya enterprises.

Practically all types of connecting parts 57-1,420 mm in diameter, made for pressures of 5.6-7.5 MPa, have been mastered at the Novosineglazovskiy Constructional-Structure Combine with the introduction in 1983-1984 of capacity for the manufacture of taps (hot bending of pipes) 1,020-1,420 meters in diameter and tees 57-426 mm in diameter that are made for pressures up to 10 MPa (hydraulic pressing of pipe).

Today's job is to master the production of connecting parts that were designed for a broader range of pressures--from 2.5 to 12 MPa--and which are suitable for operation at temperatures of +150 degrees to -60 degrees C. Moreover, the task has been set of manufacturing pipeline members over a broad range of standard sizes and outfitted connections for compressor and pump stations as well as for facilities for building up the oil and gas fields.

This year the combine is faced with the task of preparing production facilities for the manufacture of outfitted working connections for compressor stations equipped with GPA-Ts-16 units.

The forthcoming rebuilding and reequipping of the combine will enable the manufacture of connecting parts to be increased 1.62 fold, pipeline members 4.9-fold.

A complex of special metal-cutting and forging-and-pressworking equipment will be introduced for machining the ends of parts 57-1,420 mm in diameter before welding, for sizing butt-end parts 530-1,420 mm in diameter, and for shaping branches up to 800 mm in diameter, with the use of local induction heating in tees and tee members for pipe components up to 1,400 mm in diameter. This equipment will provide for high quality and reliability of both parts and pipe components and of pipeline systems as a whole, and it will greatly reduce the labor used in assembling pipelines by insuring precisely the prescribed sizes of the connecting ends of the parts.

Expansion of the machine-tool pool and equipping the combine with metal-cutting equipment with a wide potential for machining will enable the pace of technical preparation for production (primarily the manufacture of forging tooling) to be speeded up in order to master a range of connecting parts with the required spectrum of working parameters.

A series of ganged machine tools will be introduced for machining the ends of parts up to 530 mm in diameter, and four IR4000FZ-model machine tools with numerical program control will be introduced for machining connecting ends and parting edges of pressworked and welded taps and tees 530-1,420 mm in diameter before welding.

The combine has carried out, jointly with Denpropetrovsk Metallurgical Institute imeni L. I. Brezhnev, a set of scientific studies on the thermal hardening of connecting parts. The purpose of this work was to achieve the guaranteed mechanical properties of the parts and high reliability at the various temperatures found during the construction and operation of pipeline systems.

The results of the research indicated that, while the required strength properties are still provided for, the metals intensiveness of the parts can be reduced up to 20 percent, or the working parameters of parts whose production has been mastered (where there is forging tooling) can be greatly raised.

Thermal capacity for hardening parts is to be erected when the combine is rebuilt.

Jointly with the Institute of Electrical Welding imeni Ye. O. Paton, a method for automated two-electrode welding of parts, with forced shaping of joints, has been developed and is being readied for industrial introduction. Work has started on the creation of a technology for electron-beam welding of parts. In the fourth quarter of 1985 the results of experimental work will be obtained on the manufacture and testing of a test lot of tees, adapters and taps welded by an electron beam.

With the participation of the Proyektneftegazspetsmontazh SPKB [Special Design-Development Office], the production of small connecting parts will incorporate robotics.

Soyuzneftegazstroykonstruktsiya, jointly with VNIIST [All-Union Scientific-Research Institute for the Construction of Trunk Pipelines], will work on the creation of materials and technology for protecting parts from corrosion. Two areas of work are planned--for parts that operate underground and for those that operate in the atmosphere.

The first area is in the starting stage today. Some results have been obtained in the second area: an experimental primer has been developed. It is not toxic, it is fire and explosion proof, it conducts current, it dries quickly in the air and, when refined somewhat, it permits welding to be performed without prior cleaning of the end.

Further development of connecting-parts production will require a systematic and highly scientific approach. In our view, in order to speed up the introduction of new developments as well as coordination of the work of the scientific forces involved, a specialized industry-wide scientific-experimental base is required. It is desirable that it be established at the Novosibirsk Neglazovskiy Combine, after a special section of VNIIST is organized and the industrial design-development base of the Chelyabinsk Branch of Proyektneftegazspetsmontach SPKB has been strengthened.

Mobile off-the-shelf buildings are important for developing the association's industrialized construction methods. The share of such buildings in the total volume of commodity output in 1985 will exceed 28 percent. The association's enterprises will manufacture four types of mobile buildings.

The Oktyabrskiy Metal Constructional-Structure Plant of PO Blokzhilkomplekt [Production Association for Outfitting Modular Housing] is producing mobile containerized buildings for housing, social, personal-services and auxiliary-production purposes.

The Bugulma Constructional-Structure Combine of PO Blokzhilkomplekt is making BZh-3 type housing cars, and the Volokolamsk Constructional-Structure Plant is building mobile TsUB-2M housing cars. In 1985, 4,450 buildings totaling 114,000 m<sup>2</sup> in area (1,950 BZh-3 and 2,500 TsUB-2M buildings) are being produced. For the buildup of the Yamburg field, 250 TsUB-2M housing cars were produced and delivered ahead of schedule.

At the Serpukhov Constructional-Structure Combine, serial production of outfitting rapidly erected mobile buildings made with SKZ-M system constructional structure, which are to be used for auxiliary-production, cultural and domestic-services purposes, has been mastered. This combine has manufactured and shipped buildings for mechanical-repair shops 1,004 m<sup>2</sup> in area and a production building of 2,160 m<sup>2</sup> area.

In order to reduce construction periods under West Siberia's complicated conditions, the association's enterprises must in the near future greatly increase the production of mobile buildings and, what is especially important, must raise their utilitarian and technical levels. First of all, it is necessary to provide buildings that are outfitted and readied at the factory to the maximum extent and consume a minimum of materials, and to reduce labor and materials consumption for their manufacture, transporting and erection. New structure for mobile buildings should be mastered for construction of the main production facilities of the oil and gas industries and also of the industry's own industrialization base. The quality and comfort of mobile buildings for housing, cultural and personal-services purposes must be raised sharply, based upon the use of new constructional solutions and progressive materials and articles. Wide unification of all types of mobile buildings should be pursued.

In order to develop the production of rapidly erectable outfitted buildings, the Serpukhov KSK [constructional-structure combine] is developing, jointly with Proyektneftegazspetsmontach SPKB and USSR Gosstroy's NIISK [Scientific-Research Institute for Constructional Structure], a set of new unified structure for mobile buildings of increased height, with bays of 12, 18 and 24 meters, intermediate frame-free panel inserts, and 6-meter column interval. Structure with reduced metal consumption and effective insulation is used in them.

An experiment in the manufacture and construction of a compressor department with STD-4000's and made of unified BKZ structure, whose technical solutions were developed at Minga by NIISK at the request of the Ministry of Gas Industry, is being prepared.

The unification of BKZ structure for all types of buildings under the principle of a single source for materials and technological processes will enable highly mechanized and automated production to be established, using the newest achievements of science and technology (microprocessor equipment, robots, and so on). Progressive domestic experience in producing lightweight metal structure, which permits the output of articles to be increased and their quality raised without hiring additional workers, will be used widely in design solutions for structure of the buildings and the technology of their manufacture.

For example, in order to minimize materials and labor expenditures, automated wastefree technology for manufacturing beams of enlarged cross-section with holes in the web, made of rolled and shaped sections, will be designed and introduced for the manufacture of load-bearing framework members, all based on existing domestic developments. It is proposed that this technology be used later to produce traditional metal constructional structure.

Flame-resistant cast polyurethanes, whose production industry has already mastered, will be adopted as the base for progressive structure for lightweight enclosure panels.

Rebuilding of the Takhiatash and Volokolamsk plants will provide for an increase in the output of mobile buildings, outfitted modular installations and metal constructional structure.

The Volokolamsk plant will master the serial output of new types of buildings--TsUB-6M two-unit pipeline-route apartment buildings, the TsUB-8 therapeutic and public-health (sauna and bath) module, and the TsUB-4M pipeline-route mobile first-aid station.

In order to improve the technology for manufacturing mobile housing, the introduction of mechanized assembly lines for making the frameworks of mobile homes, using high-frequency welding, is called for. Major work is to be done in creating and introducing into production mechanized technology for the assembly, insulation and interior decoration of housing cars. Today 79 percent of the manual labor goes to these operations.

Creation of the Blokzhilkomplekt Production Association, which includes the Oktyabrskiy ZMK [Metal Constructional-Structure Plant], the Bugulma Combine and the Urussu DOK [Woodworking Combine], within the VPO Soyuzneftegazstroy system will open up the potential for organizing a high degree of specialized

production, for example--specialization by component, by part and by operation at enterprises that are producing a single finished article. This, in its turn, will enable a highly mechanized production technology, using robotics, to be created. However, the requirement arises for constructional and technological correspondence of the subject itself of the labor with this goal.

Mobile containerized buildings being produced today do not meet such requirements. This is confirmed by the data on manual-labor use. At the Oktyabrskiy ZMK more than 54 percent of the workers are engaged in manual labor in producing containerized buildings.

There are at present more than 160 modules, which differ in design and sometimes are different even for buildings of the very same purpose. Soyuzneftegazstroykonstruktsiya, the Oktyabrskiy ZMK, and NIISK are developing new types of structure. A frame-and-panel containerized variant 3x3x6 meters in size is the basis for one of them. The containers are interlocked in the buildings through a corridor type insert module in which the utilities networks are placed.

Frame-and-panel structure permits various members of all types of buildings and containers for various functional purposes--as many as 25-30 specific types--to be unified. Dispensing with three-dimensional welded structure precludes the need to use metal for the walls of adjacent modules. The corridor insert module provides an original solution for bringing service and utility lines to the premises and increases the useful space. Public-use premises (dining halls, recreation rooms, and so on) can be created in these designs. Moreover, frame-and-panel construction of the container will enable the buildings to be delivered in the form of three-dimensional prefabricated modules or packets (the shipment variant is determined by its economic desirability).

In developing new-generation unified mobile, rapidly erectable, outfitted and containerized buildings, a potential for ganging and creating combined construction is called for. Two designs now exist for combined buildings made of SKZ-M and VZhK type structure. These are the buildings for the SERB and the cultural and health-improvement complex.

Buildings for housing, social, cultural and personnel-services purposes with common-use premises large in area can be created with the new-generation combined structure. For example, a housing building with a covered sports area and hothouse, a school with gymnasium and production workshops, a kindergarten with covered area for taking walks, shopping centers, sports structures, clubs, Palaces of Culture, cinemas, and so on. Such buildings can find wide application in West Siberia's northern regions.

The association is searching for new materials that possess high constructional, thermal-insulation and decorative characteristics, which will provide for the creation of highly industrialized and effective structure. Among the existing progressive materials are board made of cement and chip, gypsum and chip, and cement, perlite and fiber. The association is preparing proposals for organizing the production of these materials.

The final goal that should be reached as a result of the indicated developments is the creation of a comprehensive industrialized system for the turn-key construction of facilities for residential and production purposes, using mobile buildings.

In order to realize this goal, a concentration of efforts by many of the ministry's organizations is required. Primarily, a dedicated structure-testing base must be created for the industry.

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